2010300031-Winnebago County
Rockford Products #3
IL0005212097
Groundwater, File

Rockford
Cold Formed Products

EPA Region 5 Records Ctr.

393574

Rockford Products Corporation
707 Harrison Avenue
Rockford, Illinois 61108-7197
(815) 397-6000
Easy Link 910997-7453

January 11, 1988

RECEIVED
REGION 1 D.W.P.C.

JAN 1 _ 1988

ENVIRONMENTAL PROTECTION AGENCY
STATE OF ILLINOIS

Mr. Harris Chien
Regional Coordinator
ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
4303 North Main Street
Rockford, IL 61103

Re: Rockford Products Seepage Pit

Dear Mr. Chien:

Enclosed with this letter is a copy of the findings of M. Rapps Associates, Inc. on completion of the Twelve-month Groundwater Data Collection Program at Rockford Products Corporation, Plant 3. Rapps notes that there is little to be gained by continued sampling of the monitoring wells.

Thus, it seems to us that continuation of this groundwater monitoring is not necessary.

Rockford Products requests the IEPA to bring the seepage pit matter to a quick close.

Sincerely,

ROCKFORD PRODUCTS CORPORATION

Larry Hammond

Larry Hammond
Industrial Consultant

LH/sf

Enclosure

cc: T. E. Johnson, Executive Vice President
Roy Morris, Manager, Plant Facilities

RECEIVED
IEPA-DLPC

M. Rapps Associates, Inc. 2387 WEST MONROE, SPRINGFIELD, ILLINOIS 62704 — (217) 787-2118
ENVIRONMENTAL ENGINEERING

January 4, 1988

RECEIVED
REGION 1 DIV...
JAN 1...
ENVIRONMENTAL PROTECTION AGENCY
STATE OF ILLINOIS

Rockford Products Corp.
707 Harrison Ave.
Rockford, Illinois 61109

ATTN: Larry Hammond

RE: Rockford Products Corp. (RPC)
Plant No. 3

Dear Mr. Hammond:

We recently completed the twelve month groundwater data collection program at the above plant site. Data gathering occurred monthly from November, 1986 through October, 1987. We have now organized the data and have reviewed it in the context of conditions known to exist in the area. This is to summarize our findings.

Analyses were conducted for Volatile Organic Contaminants (VOC's), metals, and a number of organic or inorganic indicator parameters. But, in review of the data, and certainly as relates to the seepage pond, the parameters of concern in this matter are clearly the VOC's. In this regard, a concise overview of the findings is given in Attachment No. 1. As the Attachment indicates, a total of eleven volatiles were found in the various media at levels above reporting limits. However, only five of these were reported on a re-occurring basis at more than one sampling location, or were not otherwise obscurred by reported background contamination in the field or trip blanks. Regarding the latter, Acetone and Methylene Chloride, both commonly used in lab clean-up, were reported as present in virtually all sample blanks. This does not imply their absence in the field, but neither can their presence be verified on the basis of the data at hand. Moreover, reported levels of Methylene Chloride in the sampled media are virtually equivalent to levels found in the blanks. Consequently, we have concluded that if Methylene Chloride is present, it probably exists at reasonably low concentrations. Intuitively, we think it even less likely that Acetone is present in the field, both because it is subject to fairly rapid decomposition and because it is rarely found in groundwater.

Setting aside the two VOC's just discussed, and the trace organics detected on only a single occasion, the list of pertinent contaminants reduces to:

1,1,1-Trichloroethane	(TCA)
1,1-Dichloroethane	(1,1-DCA)
1,1-Dichloroethene	(1,1-DCE)
Trichloroethylene	(TCE)
tr-1,2-Dichloroethene	(1,2-DCE)

It might be noted that 1,1-DCA and 1,1-DCE are both decompositon by-products of TCA and that 1,2-DCE is a decompositon by-product of TCE. In this light, the problem at hand may trace almost entirely to two raw materials, TCA and TCE. Both are industrial degreasers that have been widely used in the manufacturing sector in Rockford.

The presence of widespread and substantial groundwater contamination in Rockford's southeast quadrant, albeit a sensitive subject, is now fairly well established. The State Water Survey Division (ISWS) of the Illinois Department of Energy and Natural Resources (ENR) has studied this problem in recent years and has drafted a report ("A Regional Groundwater Quality Characterization of the Rockford Area, Illinois") that discusses groundwater problems in the area in some detail. Although the report is in draft form and has not as yet been released, ISWS' Allen Wehrmann was kind enough to allow us to review a copy. The report identifies the partial findings of VOC analyses from public and private wells throughout the Rockford area. This, coupled with information from our files regarding a groundwater investigation conducted just North of the People's Avenue Landfill, was used to construct Attachment No. 2. The Attachment reveals, at a glance, the widespread extent of VOC contamination in Southeast Rockford. RPC apparently resides in the center of a fairly extensive area of contaminated groundwater.

Referring again to Attachment No. 1, the highest observed and verified VOC levels in groundwater, and that have been found on a re-occurring basis, are generally those in water taken from the plant production well(s). This is background contamination. An exception is as regards TCE and 1,2-TCE found in well No. 11. While this is also background contamination, it seems to be unrelated to that found in the producton water.

IEPA

Notwithstanding, VOC contamination is clearly endemic to the area. The origins of this contamination may trace back to decades of past or on-going releases from a multitude of sources.

It may appear that the plant is removing pollution from a location and then returning the pollution to the same location but, this is not entirely true. RPC's production well(s) draw water from the deepest part of an alluvial/outwash aquifer that locally is approximately 200' thick. Aquifers of this type are typically anisotrophic.....meaning that overall permeability in a vertical plane is lower than in a horizontal plane. Consequently, significant stratification in water quality often occurs. This is because, absent any short circuiting along well casings and the like, the travel time to the deep part of the aquifer from a near surface pollution source may be considerably longer than to a nearby well that is screened near the top of the aquifer (i.e., the monitoring wells). In this vein, it appears that RPC is collecting "old" pollutants in its deeper wells, and which perhaps originate from over a very large area, consolidating them in the plant cooling water, and then concentrating them in a relatively small area at the top of the aquifer near the seepage pond. In the process, it appears that there may be some VOC losses, perhaps through volatilization while the water is in use. It also appears that some measure of contamination is being retained and concentrated in the silt and sediment at the base of the pond.

A series of isopleths for TCA, TCE and 1,2-DCE are attached. They illustrate the effects of the just described scenario at the top of the aquifer. The parameters 1,1-DCA and 1,1-DCE have not been contoured, but their isopleths would resemble those done for TCA. The isopleths suggest that VOC's observed in monitoring well W-11 represent a separate source of contamination that is apparently not directly related to the seepage pond. Well W-11, which is roughly 1200' from the East border of the Peoples' Avenue Landfill shows high levels of TCE and 1,2-DCE, but not TCA and its by-products. TCE and 1,2-DCE have also been found in wells near the seepage pond, albeit at lower levels. Latter concentrations are on the order of background levels found in plant producton water. In addi-

to the seepage pond and which may stem from still another source.

IEPA/DL

Conditions at RPC are typical of what one might expect to find at virtually any location in Southeast Rockford. That is, we are seeing a super-position of a fairly straight forward local conditions set atop a collage of more complex regional conditions. This situation exists, we think, both as a result of the heavy concentration of industry in the area, and because of the high susceptibility of groundwater in the Rock River Valley. Noted researcher Mary Anderson of the University of Wisconsin has shown that urbanization per se influences groundwater quality. But, this is particularly true in an area like Rockford that has very porous sub-soils and which also has a heavy concentration of industry. Virtually any contaminant source in the area can rapidly affect groundwater near the top of the aquifer. In contrast, it takes a longer period of time for contaminants to reach deeper parts of the aquifer. This is basis for the characterization of background VOC's in production water as "old" pollutants.

In considering the matter of old versus new contamination it occurred to us that on-going sources of "new" contamination will generally be evidenced in the unsaturated zone. Consequently, contamination at the top of the aquifer should reflect the influence of precipitation as rainfall events flush additional material into the saturated zone. In this regard, we have obtained Rockford's precipitation records for the twelve month sampling period. They have been plotted versus time, concurrent with plots of various VOC concentrations and water levels, at representative sampling points. The resultant graphs are included herein as Attachment No. 3. Attachment No. 4 is a tabular summary of water quality data and groundwater levels. The precipitation records are included as Attachment No. 5.

Total precipitation during the twelve month sampling period was 36.7 inches, a figure that is very near the mean annual precipitation for Rockford. However, nearly 40% of this total fell during only two months, July and August. All other months received below normal precipitation. Consequently, we anticipated that if significant contamination were present in the unsaturated zone, VOC levels might show marked increases following the flushing from record storms of the late Summer. This did not happen and, in fact, VOC levels tended to diminish. Although it cannot be infered from this that the unsaturated zone contains no contamination, neither does it suggest the presence of great quantities of VOC's above the water table. The only apparent exception is as regards the semi-saturated zone immediately beneath the seepage ponds. And, the downward movement of contaminants from the pond is more

IEPA

likely via a nearly steady-state flow that is influenced more by the hydraulic head in the pond than by precipitation per se. This seepage has caused the development of a very slight groundwater mound immediately beneath the pond. The mound reflects only that net infiltration beneath the pond is somewhat greater than it is in surrounding areas.

The number and distribution of monitoring wells was originally established in order to accommodate the very flat hydraulic gradients evidenced in the drift aquifer. Those gradients made it difficult to establish the direction of flow such that we felt that it might not be possible to find a true upgradient well. We were additionally concerned that heavy intermittent pumpage in the area might cause the direction of flow to fluctuate periodically. Both fears have been realized. Attachment No. 6 is a set of groundwater contours pertaining to the twelve sets of water level readings, and to the averaged readings for the twelve month period. As is apparent, local and regional pumping is causing flow patterns to vary in a nearly random fashion. Groundwater flow is frequently in opposite directions from one period to the next, or is often in many directions. As such, conventional upgradient-downgradient groundwater monitoring is not possible. Similarly, seepage rates are not constant, but vary considerably as a function of fluctuating localized gradients. Assuming a hydraulic conductivity of 1800 GPD/ft^2, an effective porosity of 0.25, and horizontal gradients ranging from .015 to .0004 ft./ft., seepage rates could vary from 0.3 to 14.4 feet per day. And, these rates vary from one location to the next, and from day to day.

To summarize, RPC's production water, which is taken from deep within the drift aquifer, is contaminated with volatile organics, principally TCA, TCE, and their by-products. This may be symptomatic of more extensive regional contamination that has been identified in Southeast Rockford. The process water apparently retains most of the contamination during its use in the plant and thereafter when it is passed through to the seepage pond. From there the contamination, minus losses retained in pond sediment, seeps to the groundwater where it is evidenced at the top of the aquifer. The impact of the seepage pond is fairly obvious near the pond but may converge upon contamination from other sources at points to the East and to the West along Harrison Avenue. These three areas at the top of the aquifer are distinct from the deeper zone of contamination at the bottom of the aquifer. In the aggregate, the seepage pond is causing a redistribution of existing aquifer contaminants. There is no evidence to indicate that plant activities are contributing additional contamination to this system.

Groundwater flow is multi-directional and subject to significant variation due to local and regional pumpage. Seepage rates are similarly variable due to the influence of pumping on hydraulic gradients. These variations are such that a true upgradient-downgradient monitoring network cannot be established. Moreover, flow conditions are something akin to a giant mixing bowl which tends to defeat attempts to define long term flow patterns.

In light of the information at hand, we believe there is little to be gained by continued sampling of the monitoring wells. The problem is regional in scope and may be beyond the practical limitations of normal remediation efforts. We are aware of no Illinois precedent that matches the circumstances at RPC. Nor can we define RPC's responsibilities as regards discharge from the seepage pond. It is a non-point source that is not subject to prescribed effluent limits. And, the pond is not adding to the pollutant load in the aquifer, but is merely redistributing existing pollutants. Moreover, elimination of the pond will do nothing to remediate the groundwater contamination evident throughout the area.

We are hopeful that this information proves useful. If any questions arise please let us know.

Thank you.

Sincerely,

Michael W. Rapps, P.E.

MWR/jh

RECEIVED

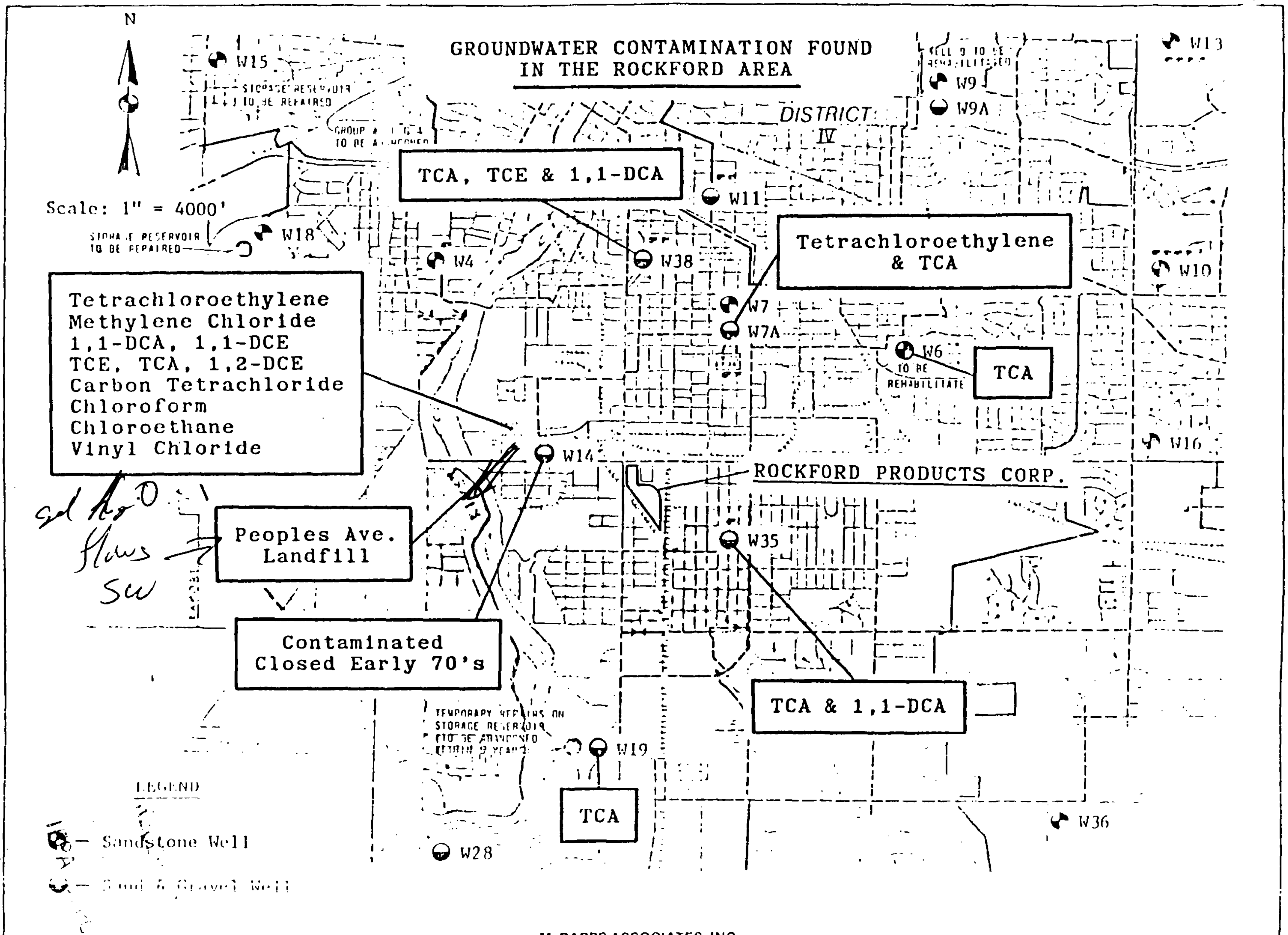
IEPA

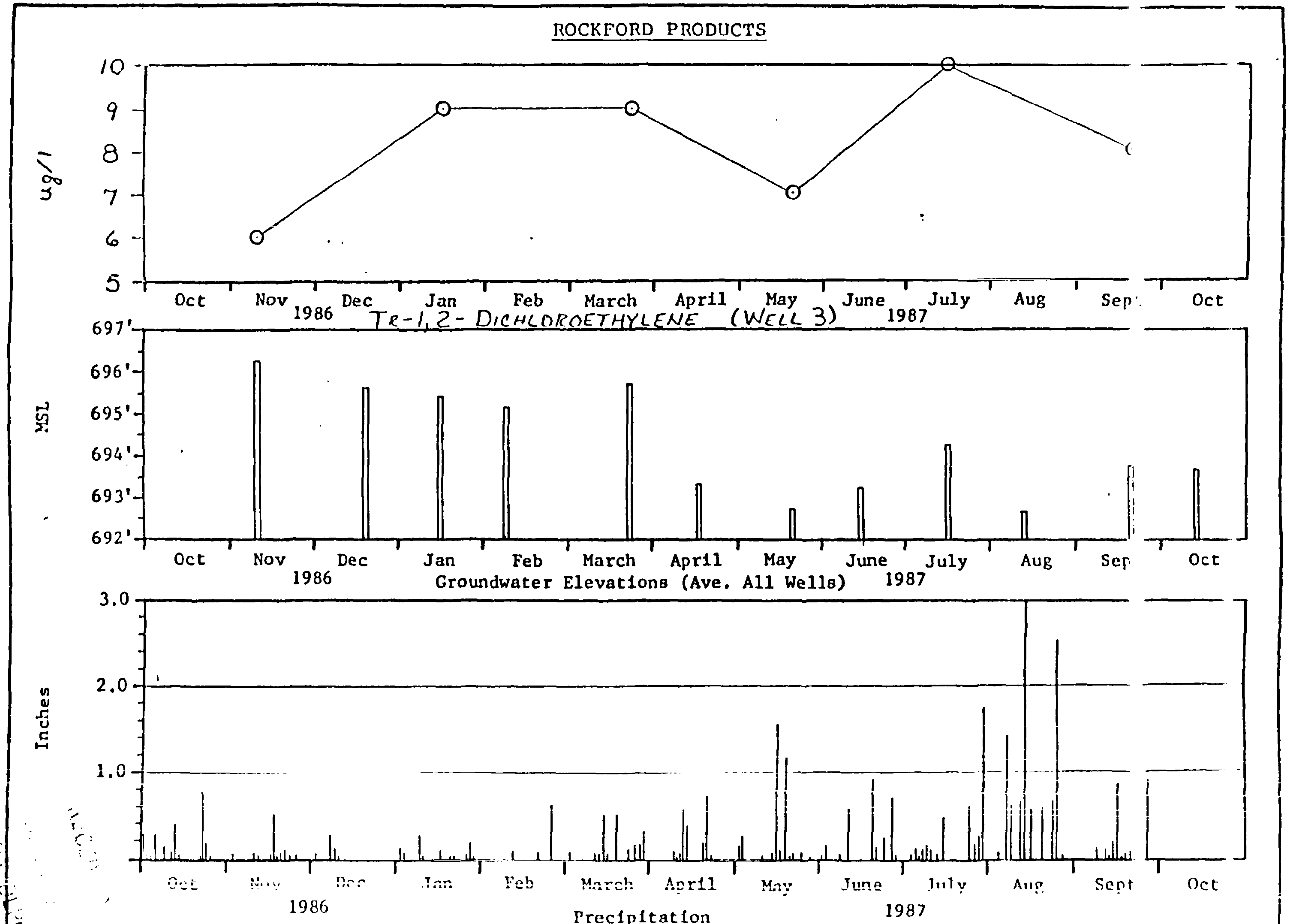
DATA SUMMARY

Maximum Observed Concentration (ug/l)

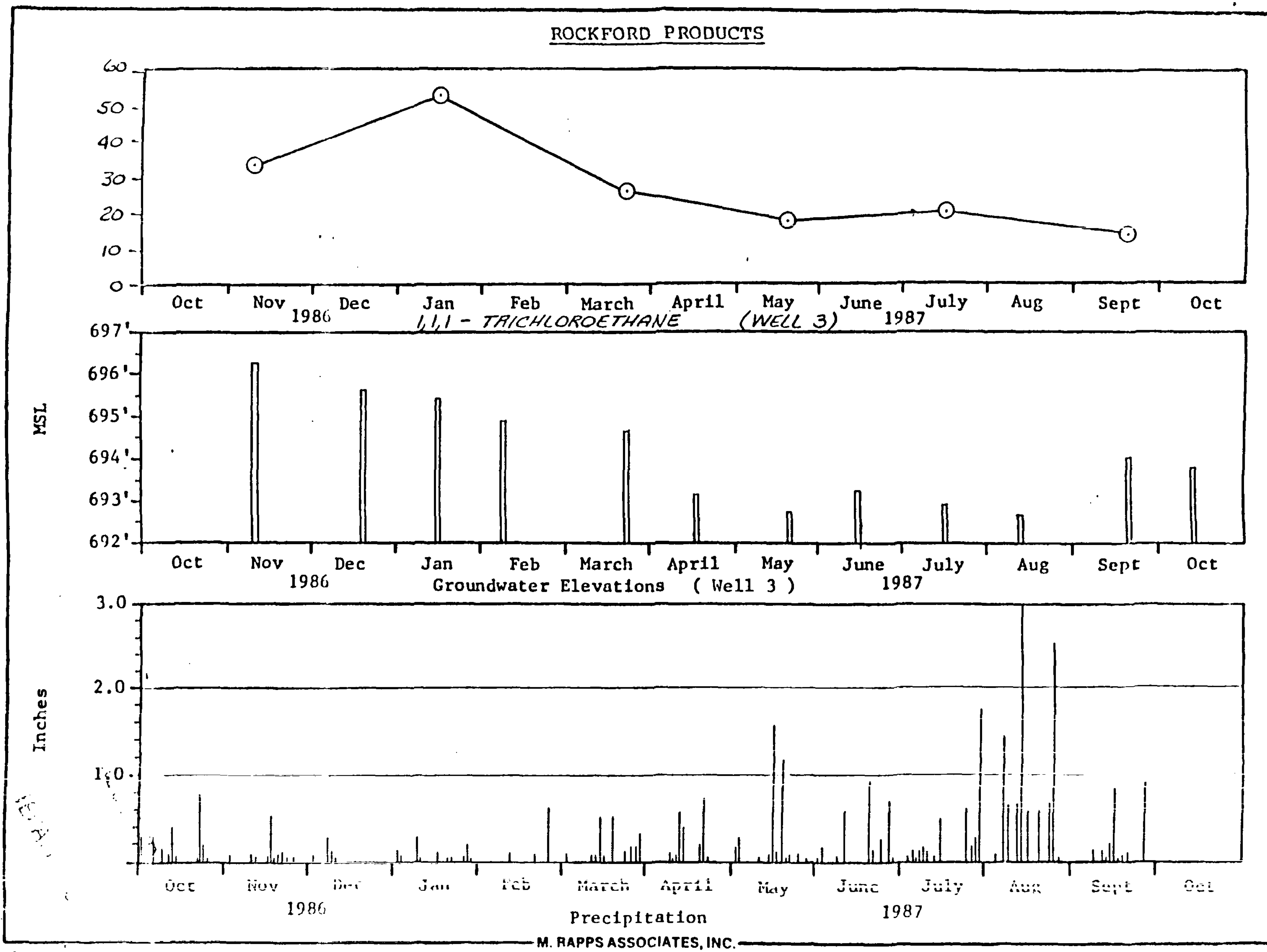
Compound	Plant Well	Seepage Pond	Sediment	Monitoring Wells.	@ Well No.	On Date
1,1-Dichloroethene	38	16	35	10	No. 10	7-15-87
1,1-Dichloroethane	25	14	59	25	No. 4	1-16-87
tr-1,2-Dichloroethene	25	14	24	41	No. 11	11-11-86
1,1,1-Trichloroethane	200	71	47	53	No. 3	1-16-87
Trichloroethylene	49	26	54	320	No. 11	1-16-87
1,2-Dichloroethane	8	-[3]	-[3]	41[1]	No. 2	1-16-87
Carbon Tetrachloride	-[3]	-[3]	-[3]	5[1]	No. 8	5-21-87
Tetrachloroethylene	6	-[3]	12	-[3]	-	-
tr-1,3-Dichloropropene	-[3]	-[3]	-[3]	9[1]	No. 2	1-16-87
Acetone[2]	29	30	159	52	No. 10	3-24-87
Methylene Chloride[2]	8	7	56	15	No. 8	3-24-87

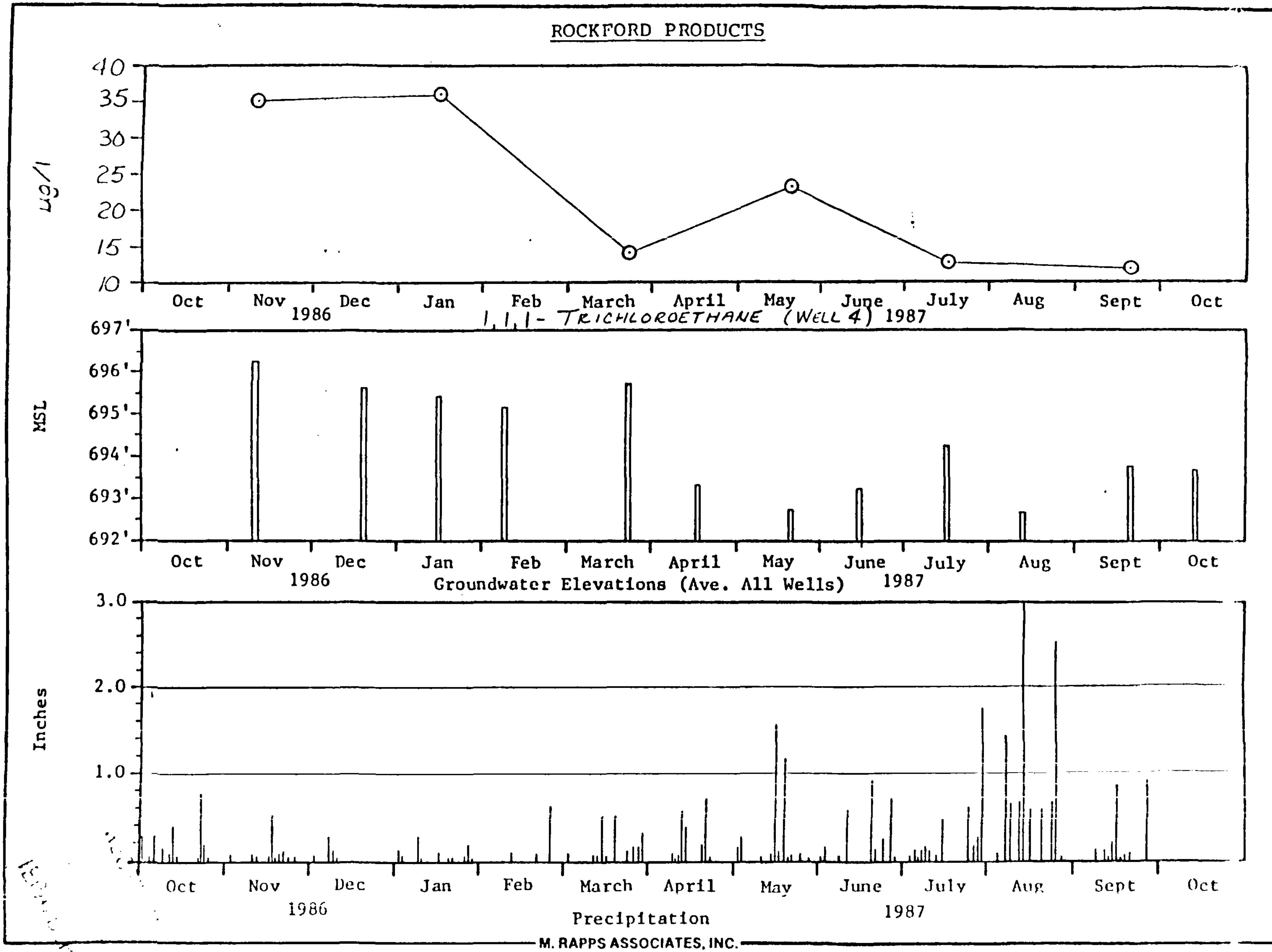
NOTES: 1. Substance identified one time in a single groundwater sample.
2. Substance regularly reported in trip or field blanks; may not be present in actual samples.
3. Below detection limits.


GROUNDWATER CONTAMINATION FOUND IN THE ROCKFORD AREA
N
Scale: 1" = 4000'
W15
STORAGE RESERVOIR TO BE REPAIRED
W18
W4
W38
W11
W9
W9A
W13
W10
W7
W7A
W6
TO BE REHABILITATE
W16
W14
W35
W19
W28
W36
DISTRICT IV
TCA, TCE & 1,1-DCA
Tetrachloroethylene & TCA
TCA
Tetrachloroethylene
Methylene Chloride
1,1-DCA, 1,1-DCE
TCE, TCA, 1,2-DCE
Carbon Tetrachloride
Chloroform
Chloroethane
Vinyl Chloride
ROCKFORD PRODUCTS CORP.
Peoples Ave. Landfill
Contaminated Closed Early 70's
TCA & 1,1-DCA
TCA
gd h2O flows SW
LEGEND
Sandstone Well
Sand & Gravel Well
M. RAPPS ASSOCIATES, INC.



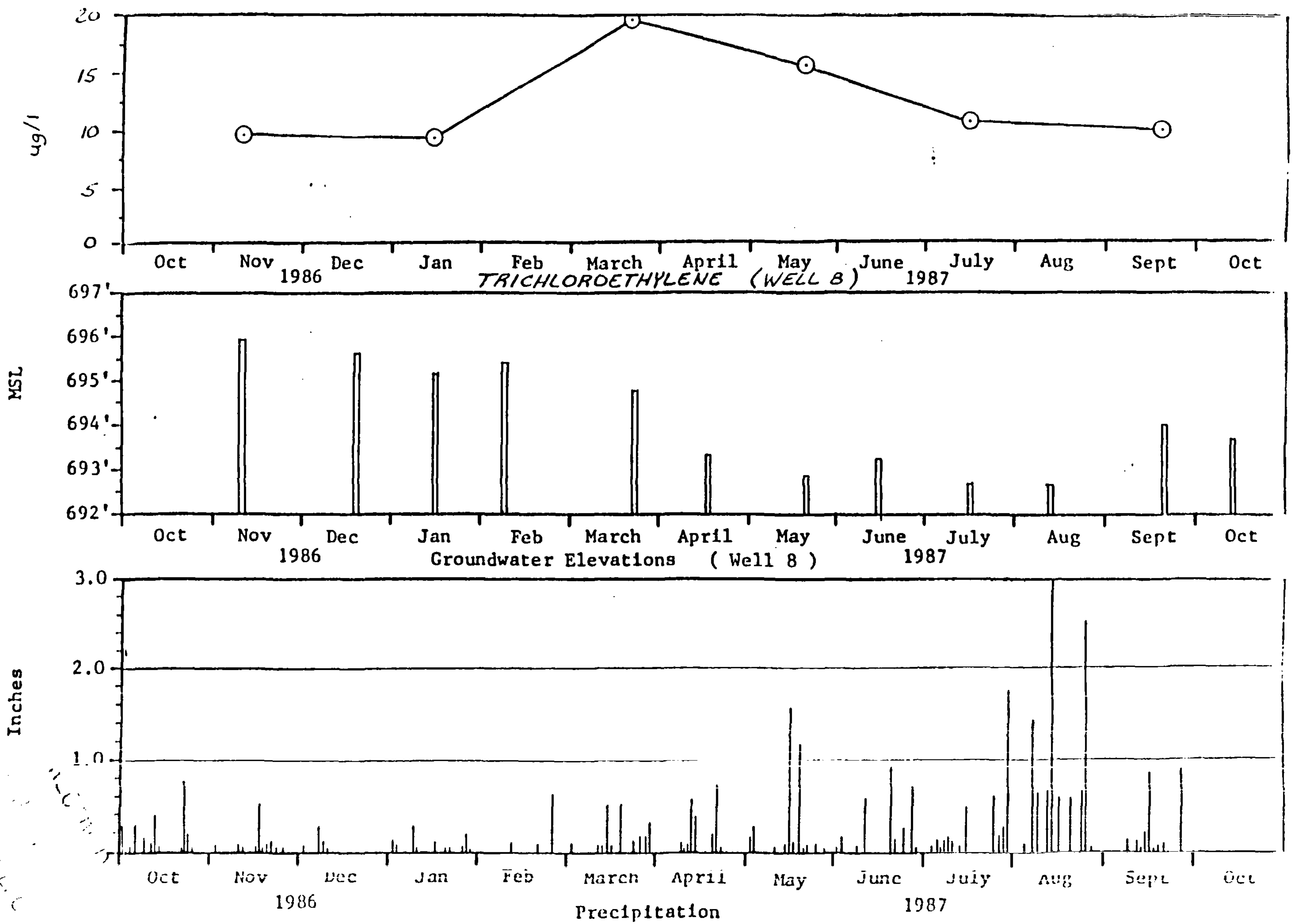
M. RAPPS ASSOCIATES, INC.


ROCKFORD PRODUCTS
60
50
40
30
20
10
0
Oct
Nov
Dec
Jan
Feb
March
April
May
June
July
Aug
Sept
Oct
1986
1987
1,1,1 - TRICHLOROETHANE (WELL 3)
697'
696'
695'
694'
693'
692'
MSL
Groundwater Elevations (Well 3)
3.0
2.0
1.0
Inches
Precipitation
M. RAPPS ASSOCIATES, INC.

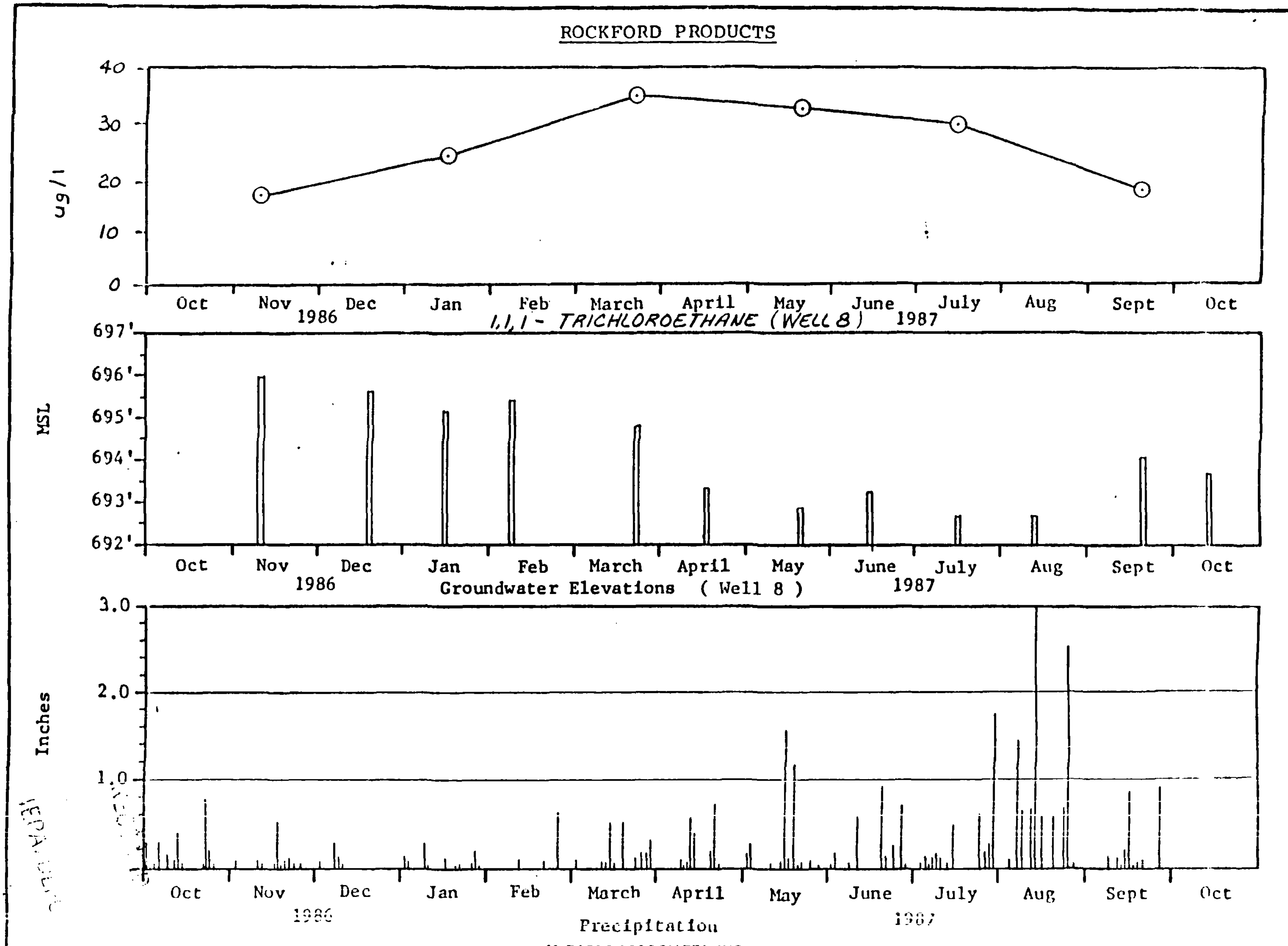


ROCKFORD PRODUCTS
ug/l
40
35
30
25
20
15
10
Oct
Nov
Dec
Jan
Feb
March
April
May
June
July
Aug
Sept
Oct
1986
1987
1,1,1- TRICHLOROETHANE (WELL 4)
MSL
697'
696'
695'
694'
693'
692'
Groundwater Elevations (Ave. All Wells)
Inches
3.0
2.0
1.0
Precipitation
M. RAPPS ASSOCIATES, INC.

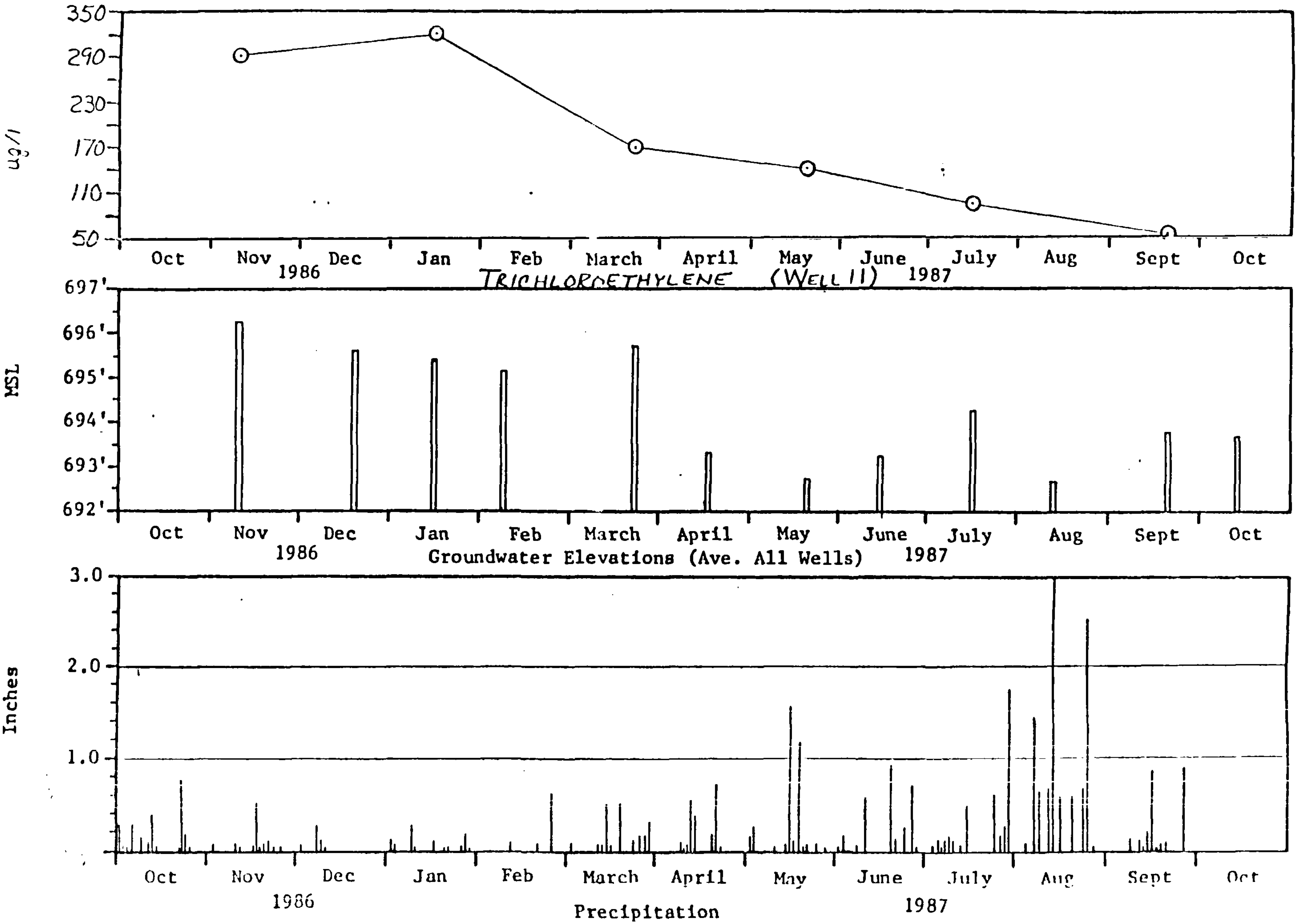
ROCKFORD PRODUCTS



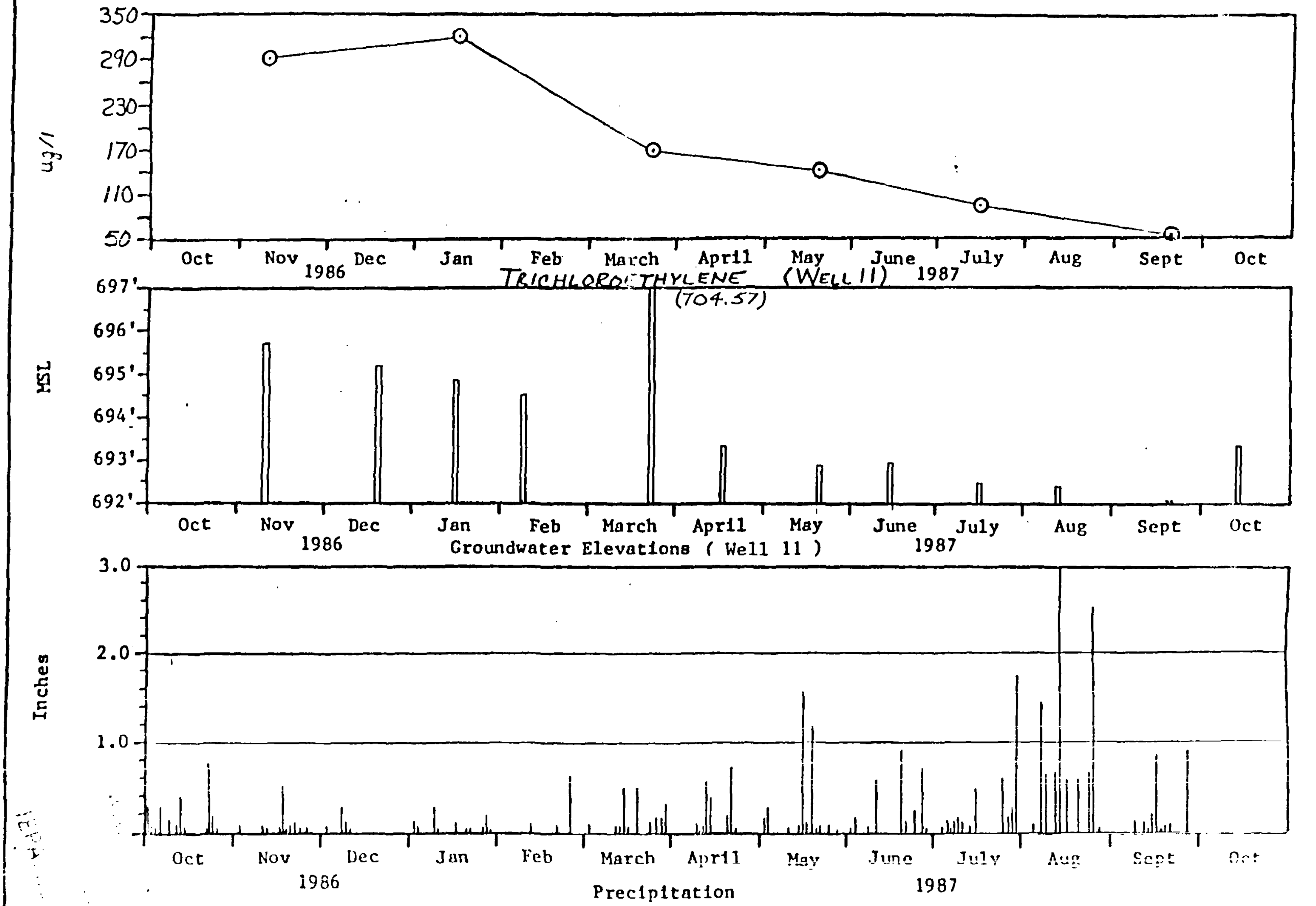
M. RAPPS ASSOCIATES, INC.


ROCKFORD PRODUCTS
ug/l
40
30
20
10
0
Oct
Nov
Dec
Jan
Feb
March
April
May
June
July
Aug
Sept
Oct
1986
1,1,1 - TRICHLOROETHANE (WELL 8)
1987
MSL
697'
696'
695'
694'
693'
692'
Oct
Nov
Dec
Jan
Feb
March
April
May
June
July
Aug
Sept
Oct
1986
Groundwater Elevations (Well 8)
1987
Inches
3.0
2.0
1.0
0
Oct
Nov
Dec
Jan
Feb
March
April
May
June
July
Aug
Sept
Oct
1986
Precipitation
1987
M. RAPPS ASSOCIATES, INC.

ROCKFORD PRODUCTS



ROCKFORD PRODUCTS



M. RAPPS ASSOCIATES, INC.

ROCKFORD PRODUCTS Groundwater Elevations Summary Nov. 86 thru Nov. 87													
Well No.	11-11-86	12-19-86	1-15-87	2-9-87	3-23-87	4-17-87	5-21-87	6-15-87	7-15-87	8-13-87	9-21-87	10-14-87	AVE.
1	696.20	695.68	695.60	695.27	694.79	693.35	692.85	693.33	692.80	692.74	694.05	693.91	694.21
2	696.15	695.62	695.30	694.95	694.65	693.28	692.87	693.32	692.90	692.70	694.01	693.73	694.12
3	696.19	695.60	695.29	694.94	694.68	693.18	692.85	693.29	692.93	692.72	694.03	693.88	694.13
4	696.04	695.48	695.19	698.24	694.61	692.73	692.18	693.23	697.82	692.50	694.12	693.66	694.65
5	696.22	695.68	695.27	694.32	694.87	693.14	692.72	693.37	698.15	692.76	694.09	693.89	694.54
6	696.08	695.63	695.33	695.01	695.68	693.43	692.65	693.37	693.23	692.69	693.10	693.60	694.15
7	696.05	695.60	694.70	694.33	694.63	693.31	692.65	693.19	691.90	692.54	693.90	693.65	693.87
8	695.96	695.54	695.06	695.45	694.72	693.36	692.84	693.24	692.61	692.64	694.06	693.67	694.10
9	695.99	695.62	695.29	694.97	694.74	693.43	692.62	693.32	693.34	692.70	693.88	693.67	694.13
10	698.35	695.87	698.50	694.85	695.09	693.59	692.91	693.52	698.10	692.78	694.13	693.86	695.13
11	695.66	695.12	694.78	694.43	704.57	693.47	692.79	692.93	692.46	692.31	691.91	693.25	694.47

Note: All elevations are in MSL.

ROCKFORD PRODUCTS 1,1,1-Trichloroethane Summary Nov. 86 thru Nov. 87							
Well No.	11-11-86	1-15-87	3-23-87	5-21-87	7-15-87	9-21-87	AVE.
1	18	17	12	06	08	09	11.67
2	33	*	34	11	18	11	17.83
3	33	53	27	18	20	15	27.67
4	35	36	14	23	13	12	22.17
5	*	*	*	*	23	*	3.83
6	*	*	*	*	*	*	*
7	*	*	*	*	*	*	*
8	17	23	35	32	29	18	25.67
9	*	*	*	*	*	*	*
10	*	*	17	16	36	14	13.83
11	*	*	*	*	*	*	*

* All values less than 5 ug/1
All values measured in ug/1

ROCKFORD PRODUCTS 1,1-Dichloroethene Summary Nov. 86 thru Nov. 87							
Well No.	11-11-86	1-15-87	3-23-87	5-21-87	7-15-87	9-21-87	AVE.
1	*	*	*	*	*	*	*
2	*	07	09	*	*	*	<6
3	*	08	07	06	*	*	<6
4	*	*	*	*	*	*	*
5	*	*	*	*	*	*	*
6	*	*	*	*	*	*	*
7	*	*	*	*	*	*	*
8	*	*	08	08	07	*	<6.3
9	*	*	*	*	*	*	*
10	*	*	*	09	10	05	*
11	*	*	*	*	*	*	*

* All values less than 5 ug/1
All values measured in ug/1

IEPA

ROCKFORD PRODUCTS 1,1-Dichloroethane Summary Nov. 86 thru Nov. 87							
Well No.	11-11-86	1-15-87	3-23-87	5-21-87	7-15-87	9-21-87	AVE.
1	18	16	11	10	14	12	13.5
2	*	06	07	*	04	05	<5.3
3	*	10	12	*	<16	26	<12.3
4	09	*	*	*	*	07	<6
5	*	*	*	*	*	*	*
6	*	*	*	*	*	*	*
7	*	*	*	*	*	*	*
8	*	*	07	07	06	*	<5.8
9	*	*	*	*	*	*	*
10	*	*	11	*	*	*	<6
11	*	*	*	*	*	*	*

* All values less than 5 ug/1
All values measured in ug/1

ROCKFORD PRODUCTS Trichloroethylene Summary Nov. 86 thru Nov. 87

Well No.	11-11-86	1-15-87	3-23-87	5-21-87	7-15-87	9-21-87	AVE.
1	07	*	06	05	04	05	4.50
2	10	*	15	06	07	05	7.17
3	12	14	13	05	07	08	9.83
4	15	08	07	10	05	08	8.83
5	13	23	25	24	07	20	18.67
6	*	*	*	*	*	*	*
7	*	*	*	*	*	*	*
8	09	08	19	16	11	10	12.2
9	*	*	*	*	*	*	*
10	*	*	*	05	13	11	4.83
11	290	320	167	140	92	51	176.7

* All values less than 5 ug/1
All values measured in ug/1

ROCKFORD PRODUCTS Tr-1,2-Dichloroethylene Summary Nov. 86 thru Nov. 87							
Well No.	11-11-86	1-15-87	3-23-87	5-21-87	7-15-87	9-21-87	AVE.
1	07	*	06	04	08	*	4.17
2	07	*	10	*	06	*	3.83
3	06	09	09	07	10	08	8.17
4	07	05	05	*	*	06	3.83
5	*	*	*	*	05	*	0.83
6	*	*	*	*	*	*	*
7	*	*	*	*	*	*	*
8	*	*	09	09	09	*	4.50
9	*	*	*	*	*	*	*
10	*	*	*	*	*	*	*
11	41	11	*	*	*	*	8.67

* All values less than 5 ug/1
All values measured in ug/1

Rockford Products Corporation

MAR 21 1986

IEPA-DLPC

Plant No. 3

Groundwater Monitoring Plan

Background

Rockford Products Corporation's (RPC) plant No. 3 is located at 707 Harrison Avenue, Rockford, Illinois. The manufacturing facility, which utilizes various metal finishing processes in the course of its operations, is situated in the heavily industrialized Southeast sector of Rockford. Most of Rockford's industrial activity, principally metal finishing and fabricating, is housed in this part of the city. Adjacent property to the East contains abandoned rail lines, a construction company storage yard, and an auto salvage yard. A conglomeration of heavier manufacturing plants, material suppliers, etc., exists farther to the East, following the Harrison Avenue corridor for several miles. Similar activity exists to the West and Northwest of the plant, including an abandoned landfill, a large foundry, a steel drum reclaimer, and various other industrial operations. Scattered pockets of residential housing exist throughout these areas, in all directions from the plant. The plant site and surrounding areas are shown in Figure 1 in the attachments.

RPC plant No.3 is situated on relatively flat ground that has little natural drainage. As a consequence, storm water from plant buildings and parking areas, joined by drainage from properties to the East, tends to accumulate and pond on plant property. Attempts to divert this water to a municipal storm sewer were unsuccessful and, as such, plant officials have found it necessary to design an on-site remedy. That solution consists of drainage features which gather and divert storm water to a dug pond or seepage pit. The main body of the seepage pit consumes a surface area of approximately one acre. Its maximum depth near the center is approximately eleven feet.

A permit to use the seepage pit was issued by the Illinois Environmental Protection Agency's (IEPA) Division of Water Pollution Control (DWPC) on March 21, 1984. That permit contains a special condition requiring installation of three monitoring wells subject to quarterly water quality testing. Water quality parameters to be monitored include Specific Conductance (S.C.), Chemical Oxygen Demand (COD), Total Organic Carbon (TOC), and Total Organic Halogens (TOX).

Requisite monitoring points were installed in January, 1985. They consist of three two inch I.D. screw coupled PVC wells with slotted screens, each set at a depth of 35.0'. Well screen sections are ten feet in length and intercept the water table. In the second quarter subsequent to well installation, each well and the seepage pit (and attendant storm water ditches) were sampled for an extensive analysis. Results are:

Culvert and Pond Samples (5-8-85)

Sample Locations

Organic Contaminant	S.W. Culvert	S.E. Culvert	Pond	Mean	Variance
1,1,1-Trichloroethane	25 ppb	81 ppb	27 ppb	44.3	672.8
1,1-Dichloroethane	5 ppb	15 ppb	5 ppb	8.3	22.2
1,1-Dichloroethylene	10 ppb	31 ppb	<5(2.5 ppb)	14.5	145.5
1,2-t-Dichloroethylene	7 ppb	16 ppb	<5(2.5 ppb)	8.5	31.5
Trichloroethylene	15 ppb	48 ppb	12 ppb	25	266

Sediment Samples (5-8-85)

Sample Location

Parameter	S.E. Sediment	S.E. Sediment @ 12"
Arsenic	< 0.001 ppm	< 0.001 ppm
Barium	0.54 ppm	0.54 ppm
Cadmium	0.014 ppm	0.005 ppm
Chromium	0.025 ppm	0.024 ppm
Lead	0.03 ppm	0.05 ppm
Mercury	< 0.001 ppm	< 0.001 ppm
Selenium	< 0.005 ppm	< 0.005 ppm
Silver	< 0.001 ppm	< 0.001 ppm

NOTE: The above are analyses of "leachate" based on the EPA EP TOX test. Organic analyses of sediment samples revealed no contamination above detection limits; typically 50 ppb.

Groundwater Samples

Sample Location

Organic Contaminant (5-3-85)	W-1	W-2	W-3	Mean	Variance
1,1,1 Trichloroethane	39 ppb	199 ppb	43 ppb	93.6	5550.2
Trichloroethylene	7 ppb	<5(2.5 ppb)	452 ppb	153.8	44,455
Indicator Parameter (1-3-86)					
S.C.	550 umhos	550 umhos	550 umhos	550	-
TOC	49 ppm	8.6 ppm	2.2 ppm	19.9	429.3
TOX	87 ppb	<5(2.5 ppb)	<5(2.5 ppb)	30.6	1586.7

These preliminary analyses indicate the presence of organic contamination in both the pond and in the groundwater; with the solvents 1,1,1-Trichloroethane and Trichloroethylene being common to both. While a greater number of organic contaminants were identified in the pond, the greatest levels of contamination are apparently in the groundwater. Inorganic analyses on sediment samples by the EP-toxicity test method do not reveal metal concentrations out of the ordinary. The same is true of organic analyses of sediment samples, and of indicator parameter analyses of the groundwater.

The water level of the seepage pit is considerably higher than groundwater levels measured in the nearby monitoring wells. This is likely due to siltation in the pit which has apparently acted to reduce the permeability of underlying soils. Those soils, which are principally sand and gravel, would otherwise be quite permeable.

The existing monitoring wells are all set immediately adjacent to the seepage pit, and are no more than 300' from each other. The close proximity of these wells to one another makes it difficult to determine the direction of groundwater flow with certainty. Groundwater in the uppermost aquifer, as is the case with most large unconfined aquifers, flows along a relatively flat hydraulic gradient.

Based on the discovery of organic contamination in the seepage pit and in the groundwater, RPC has agreed to submit a groundwater monitoring plan to IEPA. That plan is required to (1) determine the extent that any contamination from the seepage pit has migrated into the groundwater. The plan is to (2) propose the necessary number of wells, their depths and locations (one upgradient, two downgradient, minimum), provisions for measuring depth to water, a monitoring time table, parameters to be measured, and a schedule for implementation of the plan. The plan is also to endeavor to determine the extent to which contamination from surrounding properties, not owned by RPC and including the adjacent salvage yard, may be entering the RPC seepage pit. The proposal made herein seeks to accomplish these tasks.

Groundwater Protocol

Groundwater

Subject site is situated above an outwash filled bedrock valley. The glacial outwash consists principally of sand and gravel, with lesser fractions of silt and clay. It is a major aquifer. Underlying rock consists of the Galena-Platteville Dolomite, followed by the Glenwood and St. Peter Sandstones, all of the Ordovician system. Each of these serve as regional or local aquifers. The outwash and underlying rocks are hydraulically interconnected.

The base of the St. Peter Sandstone is variable throughout the area but is found locally at depths of roughly 400'-500'. It is underlain by rocks of the Cambrian System, including the Templeau Dolomite and thence the Franconia Shale, the latter of which is generally regarded as an aquitard. Confined aquifers beneath the Franconia formation include the Ironton-Galesville Sandstone and Mt. Simon Sandstone, both of the Cambrian System. The base of the Mt. Simon occurs at depths of up to 1600'. These features are illustrated in Figures 2, 3 and 4 in the attachments. They are a location map and two regional cross sections excerpted from the Illinois State Geological Survey report "Groundwater Geology of Winnebago County, Illinois (1960)".

Groundwater movement in the unconfined outwash aquifer occurs through intergranular flow. In contrast, flow in the rocks immediately beneath the outwash occurs in fractures, joints, crevices and solution channels. These rocks are semi-confined aquifers. The lower Cambrian rocks, beneath the Franconia Shale, are confined aquifers.

Bedrock near RPC occurs at an approximate elevation of 500' MSL. This is shown in a bedrock contour map (Figure 5.); taken from the Stanley Consultant's report "A Comprehensive Analyses and Development Plan for the Rockford Water System (1979)". Because ground surface elevations at RPC are in the vicinity of 720' MSL, the local thickness of glacial outwash is at least 220'. As previously indicated, this material is comprised of porous sand and gravel. Locally, its permeability is reported to be roughly 1800 (gpd/ft^2), and is said to range from 1400 - 3000 (gpd/ft^2) in other areas of the city (re: Stanley Consultants report). Transmissivity, as determined from pumping tests, is reported in the range of 300,000 gpd/ft.

Recharge to the groundwater is via local precipitation with an estimated annual net recharge of two inches (re: Stanley Consultants). However, recharge is said to also include induced flow from the Rock River. This is caused by heavy withdrawal from both drift and rock wells, the heaviest pumpage of which occurs in Southeast Rockford. The Illinois State Water Survey reports that total pumpage in this area (RIE & R2E, T43N & T44N) in 1984 was 11.98 MGD and 20.44 MGD from drift wells and rock wells, respectively. Heavy pumpage in the area creates a regional pumping cone sufficient to pull water from the Rock River to the East. Absent this pumpage, groundwater flow in the vicinity of RPC would be Westward, toward the natural discharge area of the River.

Figure 6 identifies public water supply wells located in the vicinity of RPC. It also shows the regional piezometric surface reported in the ISGS publication "Groundwater Resources in Winnebago

Groundwater Protocol

County (1948)". It shows a pumping cone centered about city wells 7 and 7A. Pumpage in the area has increased considerably since that mapping. City drift wells No.'s 9A, 11, 19, 28, 35 and 38 were all installed subsequent to 1948. In addition, there are numerous private drift and rock wells in the area shown in Figure 6, as well as dozens of private residential wells. It might be noted that public well No. 14 and several nearby industrial and residential wells were abandoned in the late 1960's as a result of contamination allegedly introduced by the adjacent Peoples Avenue Landfill. No organic analyses were performed on those wells, although shallow wells just North of well No. 14 have been shown to contain contamination similar to that at RPC.

It is presently difficult to predict the direction of groundwater flow at RPC with any precision. Although an Eastward trend is to be expected, the effect of individual wells within the regional area of drawdown, all of which pump intermittently, may be to divert groundwater flow in a number of different directions, depending upon the combination of wells in use at any period in time. The RPC plant in fact operates two production wells set in sand and gravel and which are only approximately 1500' North of the seepage pit. These wells operate intermittently with rated capacities of 300 gpm and 700 gpm, respectively. It is conceivable that groundwater in the vicinity of the seepage pit will be drawn toward the North while RPC pumps are in operation, but then move in another direction when the wells are shut down. This is also possible as regards the operation of other wells in the area. Consequently, it cannot be assumed that the direction of groundwater movement will remain constant during either short term or long term monitoring.

Groundwater flow has both vertical and horizontal components. In the uppermost aquifer, flow in the horizontal and vertical planes subscribes to corresponding hydraulic gradients and permeabilities in those planes, in accordance with Darcy's Law. Glacial outwash is typically anisotropic wherein horizontal permeabilities are greater than vertical permeabilities. However, the degree of anisotrophy is not known in this case. Horizontal hydraulic gradients are relatively flat in the outwash aquifer (i.e., 2.3' per mile). They are determined at the aquifer surface as the differences in elevation of the water table over the distance between the well points used to record those elevations. Vertical gradients are determined in the same manner except that head differences are measured between wells screened at different depths in the aquifer. However, the latter is expensive in that it requires installation of nested deep piezometers. Mathematical modeling is probably a more cost effective way to estimate vertical gradients.

The preceding overview of groundwater flow may overly complicate matters regarding monitoring of the seepage pit. Because the seepage pit resides above the water table, the highest concentration of contamination in the groundwater that might be due to the pit, will occur at the water table. That level of contamination will dilute through dispersion and mixing as it moves downward and outward. Consequently, if the seepage pit is the source of groundwater contamination, the maximum contaminant level in the associated plume will be shown in the existing wells that are set near the water table, adjacent to the seepage pit. It should be noted that because the pit is above the water table any related contamination in the

Groundwater Protocol

groundwater is likely to appear as a series of small plumes (or slugs) rather than as a continuous elongated sphere. This is all the more true given the likelihood of variable flow directions as might be caused by intermittent pumping in the area.

Variability of flow direction and the discontinuous nature of anticipated plumes suggests that a number of well samplings will be necessary in order to define subsurface contamination on a cause and effect basis. Factored into this effort is the need to distinguish between the impact of the seepage pit and any residual background contamination emanating from other sources. The uppermost aquifer is not only highly susceptible to contamination, but it also overlain by an abundance of potential contamination sources. Figure 7., taken from the Illinois State Water Survey publication "Hazardous Risk via Groundwater due to Past and Present Activities, 1984" shows the location of RPC relative to the location of hazardous waste generators, treaters and disposers in Rockford. Figure 8., from the same report, identifies RPC as being located in an area of secondary to moderate risk from hazardous waste related groundwater problems.

The monitoring plan which follows takes into account the preceding variables and seeks to optimize the effort necessary to define the subsurface plumes within the confines of RPC property. It further seeks to define the "worst case" at the water table. It does not propose to monitor the diluted plume(s) at depth, as given the current uncertainty regarding flow direction, it is not presently possible to predict flow lines at greater depths. Stream lines of vertical flow can, however, be estimated through modeling once water table contours are known. The plan will also seek to define the contaminant potential of the seepage pit using a strict protocol for gridded/stratified pond and sediment sampling. Although not part of this plan, it is also RPC's intention to attempt characterization of upstream storm water which enters plant property from the East. This aspect of the forthcoming investigation does not lend itself to routine sampling and analyses protocol and must therefore be devised by RPC on an ad hoc basis (i.e., Grab sampling of available storm water).

Monitoring Plan

1. Source Identification

In order to properly define its contents, a one-time sampling of the seepage pit will be undertaken, concurrent with the initial sampling of the groundwater monitoring network. The pit will be gridded for stratified water sampling at four locations with samples taken at three depths. A Kemmerer water sampler will be used to perform the stratified pond sampling. A description of sampling methods and a drawing of the pond showing sample locations is included herein under "Pond Protocol". Samples will be analyzed at a commercial laboratory for purgeable organics (volatiles, EPA Method 624.), the indicator parameters CL, SO_4, TDS, TOC and TOX, and the field parameters pH and Specific Conductance.

Groundwater Protocol

NOTE: The indicator parameters CL, SO_4 and TDS will be used in this program for pond and groundwater analysis because they generally relate to virtually all contaminant sources and because they are water soluble and therefore are more uniformly distributed in a body of water. In contrast, the organic contaminants in question have only slight water solubility or miscibility and are less likely to display a uniform distribution in a larger matrix of ground or surface water. It should also be noted that the joint use of TDS and Specific Conductance will eventually allow the computation of a correlation coefficient describing the relationship between the two. Therefore, TDS can be quickly estimated with use of a simple field meter.

Settled solid materials (sediment) accumulated on the seepage pit bottom will also be sampled. An Ekman Dredge will be used to obtain these samples using procedures described herein under "Sediment Protocol". Samples will be analyzed for purgeable organics, EPA Method 624. Sample locations will correspond to those of the seepage pit sampling.

Groundwater Protocol

II. Groundwater Monitoring

Figure 9. in the attachments identifies the locations of eight additional shallow monitoring wells to augment the three shallow wells now in place. A wide spacing of these wells has been proposed in order to deal with measurement limitations inherent with small hydraulic gradients. Each of the new wells will be screened so as to intercept the water table and will utilize ten foot screen lengths. Well construction will be as was used in setting the inital three wells.

Bore holes will be advanced by continuous flight hollow stem auger to depths that will allow the upper 2-2.5' of slotted screen to reside above the water table. This will accomodate water table fluctuations. Drilling equipment will be cleaned between bore holes to avoid the introduction of cross contamination between wells.

Diagrams identifying typical well details are contained in the "background data" section of this proposal. All wells will be fitted with protectors. In addition, a surveyor will record elevations (MSL datum) for the ground surface, top of pipe and top of protector for each well. Thereafter, groundwater level measurements will be reported to the nearest 0.01', MSL. In this vein, it might be noted that while measurement accuracy to 0.1' is thought to be quite good, measurement to two decimal places is more subject to variation between observers.

Protocol

Well Materials

Historically, PVC has been the material of choice in monitoring well construction. However, Teflon and Stainless steel casing have found favor in organic contamination investigations due to reported deleterious effects on the casing caused by the organics. In researching this matter it was found that low levels of 1,1,1-Trichloroethane and Trichloroethylene do not promote such effects and that, on balance, any casing related impact should be expected to be well below practical detection limits (i.e., < 5 ppb). Two papers discussing this matter, both obtained from the American Society of Groundwater Scientists and Engineers' Groundwater Manual, are attached. On this basis screw type Schedule 40 PVC casing has been recommended. The casing will be washed prior to installation, as recommended in the paper by Curran and Tomson.

Sampling Schedule

It is proposed that the monitoring network be sampled and analyzed quarterly coincident with monitoring now required by the DWPC seepage pit permit. The length of this monitoring effort will be dictated by laboratory findings, but will in no case be less than one year (i.e., four quarters). Extreme variations in individual wells would be suffcient cause to extend the monitoring period. In this regard, resolution of the problem will require enough data to establish a repeating pattern in individual wells and in all wells taken as a function of one another.

Sampling Protocol

(See Groundwater Protocol Section)

Analytical Procedures

All samples (i.e., groundwater, seepage pit water and sediment) will be analyzed for volatile organics. The seepage pit and groundwater will also be analyzed for a number of indicator parameters. The following chart is a listing of all monitoring parameters, the appropriate preservative, the maximum recommended storage period, the analytical method, and the contract laboratory(s) to be employed for analysis. Analytical methods chosen are either universally accepted in government and industry, or are those recommended by U.S.EPA:

Inorganic Analysis

Parameter	Preservative	Max. Allowable Holding Time	Lab Procedure	Lab
Chloride	0	6	Std. Meth. 407B	1
pH	1	2	Std. Meth. 423	1
Spec. Cond.	1	6	Std. Meth. 205	1
Sulfates	1	6	Std. Meth. 426B	1
TDS	1	4	Std. Meth. 209B	1

Volatile Organic Analysis

Parameter	Preservative	Max. Allowable Holding Time	Lab Procedure	Lab
Purg. Organics	1	5	USEPA 624	1
TOC	2	6	U-V Oxidation Std. Meth. 505B	1
TOX	1	4	(EPA 600/4-81-056) Interim USEPA 450.1 Std. Meth. 506	1

Codes

Necessary Preservative	Holding Time	Laboratory
0 - None	1 - 24 hours	1 - Daily Analytical Laboratories, Inc. 1621 W. Candletree Peoria, Il. 61614 (contract laboratory)
1 - Refrigeration	2 - 2 hours	
2 - H_2SO_4; Sample pH<2	3 - 48 hours	
3 - HNO_3; Sample pH<2	4 - 7 days	
	5 - 14 days	
	6 - 28 days	
	7 - 6 months	2 - Aqualab, Inc. 3548 35th Street Rockford, Il. 61109 (backup laboratory)

Implementation Schedule

The plan described herein will be implemented within sixty days of the receipt of IEPA approval. For these purposes implementation means monitoring well installation. Sampling will begin in the first quarter following plan approval. Sampling quarters are:

1st Quarter - October/November

2nd Quarter - January/February

3rd Quarter - April/May

4th Quarter - July/August

Protocol

Pond Sampling Protocol

Introduction

Described herein is a set of standardized guidelines and quality control procedures for the collection and preservation of water samples. Included are provisions for field analysis for common indicator parameters. These criteria are in conformance with methods used by the Illinois Environmental Protection Agency, Division of Water Pollution Control. They were developed with assistance from the DWPC Field Methods Manual. All methods must be followed as outlined.

Equipment

One of the most reliable and widely used type of messenger operated/vertical sampling bottles is the Kemmerer Water Sampler. This sampler can be used to obtain water samples at various depths. The Kemmerer has a sampling capacity of 2.2 liters. Accessory equipment for the sampler include nylon line and a stainless steel weighted messenger.

Field parameters obtained at each sampling location are specific conductance, pH and temperature. A Hydac meter or equvalent may be used. The Hydac Conductivity, Temperature, pH Tester allows instantaneous readings with an accuracy of ± 2% for conductivity, ± $2^{\circ}F$ for temperature, and ± 0.01 units for pH. A triple-rinse with distilled water of the sample cup and pH electrode after each test is required to ensure the integrity of sample results from possible sample carry-over. The step-by-step calibration procedure, found in the meter's instruction manual, is required prior to sample analysis.

Field Method

1. Assure that the Kemmerer Sampler is clean prior to sampling.
2. Rinse sampler a minimum of two times with pond water.
3. "Load" sampler by positioning bottom end seal away from barrel and secure top end seal with trip plate on end of center rod.
4. Locate sampling point with respect to a landmark or a grid system. Log in field book the sampling location, sample number and average water depth at each sample location.
5. Lower sampler to desired depth; a shallow sample is taken horizontally 1 foot below the surface, while a deep sample requires the bottom of the Kemmerer to be 2 feet from the pond bottom.
6. Allow line to become perpendicular to water surface.
7. Release weighted messenger to trigger Kemmerer trip mechanism.
8. Retrieve Kemmerer.
9. Using the drain valve on the Kemmerer's bottom end seal, fill the sample cup of the Hydac Conductivity, Temperature, pH Tester. Log the temperature, specific conductance, pH, and corresponding sample designation in the field book.
10. Using the drain valve on the bottom end seal, subsample directly from Kemmerer to the volatile organics sample bottles until sample occupies all air space. For inorganic analysis, field filtering is required while transferring sample to sample bottle.
11. Properly label all sample bottles with date, time, sample location, sample designation; and place in chilled cooler.
12. Complete chain-of-custody form and transport samples to contract laboratory.

Cleaning Equipment*

Prior to the use of any sampler, make sure it is thoroughly cleaned. The Kemmerer Sampler is to be cleaned prior to the field trip as follows:

1. Clean with low phosphate detergent.
2. Rinse with a 5% solution of hydrochloric acid.
3. Rinse with tap water.
4. Rinse with distilled water.
5. Upon arriving at each site prior to sampling, thoroughly rinse the empty sampler in pond water to wash away any contaminants.

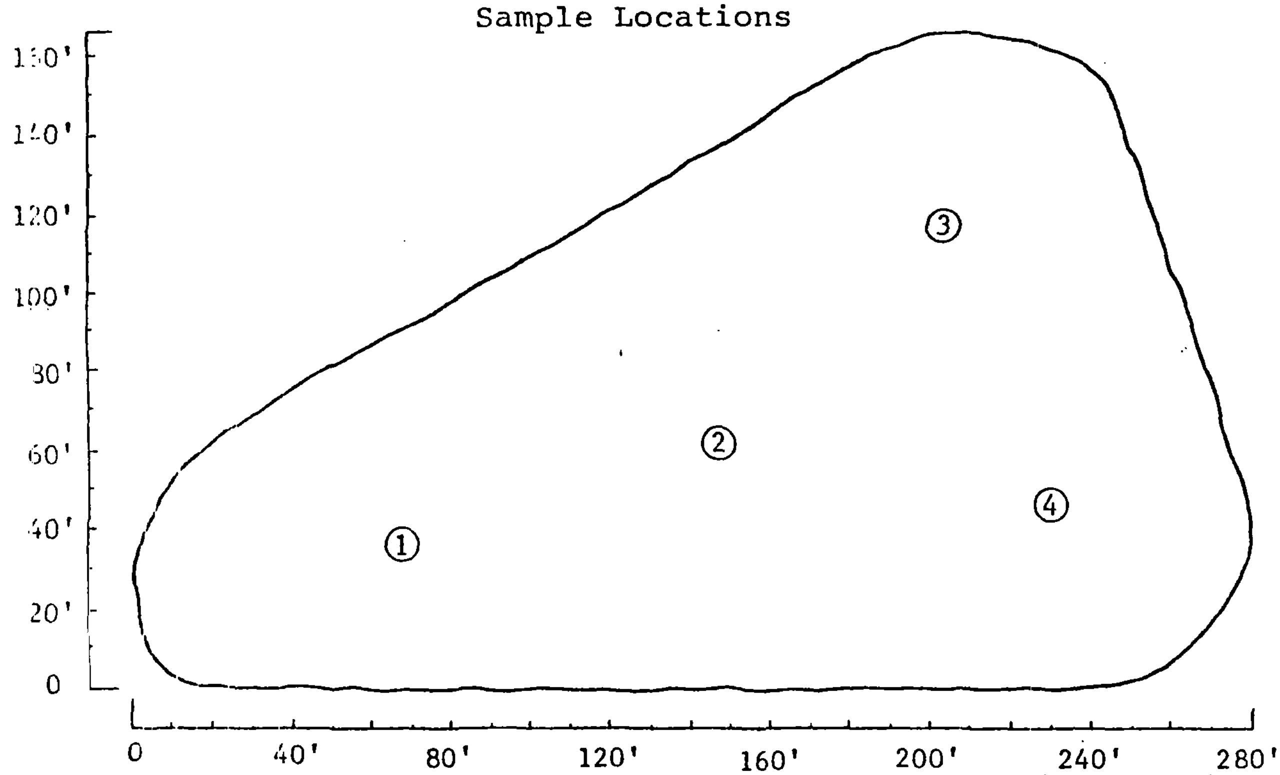
It is also recommended that in the field, after each sample location, the Kemmerer be cleaned with 5% solution of hydrochloric acid and rinsed with distilled water to prevent possible carry-over of trace metals from sample to sample.

*Taken from the Environmental Protection Agency, Division of Water Pollution Control Field Methods Manual, published in 1984.

ROCKFORD PRODUCTS CORP.

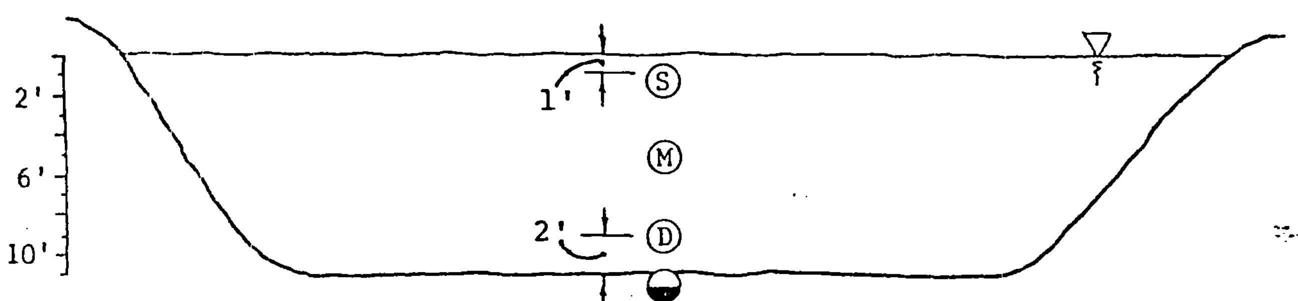
Seepage Pit

Sample Locations



Plan

Typical Stratified Sampling



Profile

(S) — Shallow Water Sample

(M) — Medium Water Sample

(D) — Deep Water Sample

— Sediment Sample

WATER
SAMPLING
EQUIPMENT

BASIC WILDCO SAMPLING BOTTLE STYLES

KEMMERER STYLE SAMPLERS — One of the most popular and oldest type of Messenger operated Vertical Sampling Bottles used today. Used primarily in water depths of (3) to (300) feet.

The Kemmerer Style is available in Brass and Nickel Plated Brass where general sampling is required and in PVC, and Acrylic Plastic with Silicone Rubber Seals where trace metal sampling is required.

ALPHA® STYLE SAMPLERS — Based on original design concept by Dr. W. Van Dorn, the WILDCO Alpha Style Bottle is designed for series sampling in deep lakes and oceans. Available in both PVC and Acrylic Plastic materials, these bottles can be used for general or trace metal sampling. Depending on whether Neoprene or Silicone Rubber Seals are used. End seals are made of semi-rigid moulded Rubber and a Drain Valve is provided for sample removal. Lifting handle included w/vert. style bottles.

Available in both Vertical (series) and Horizontal (single unit) configurations.

BETA® STYLE SAMPLERS — Similar to the Alpha Style Bottle, except End Caps consist of rigid machined plastic with gasket type seals and features a built-in lifting handle.

Seals are available in both Neoprene or Silicone Rubber materials. Depending on whether requirements are for general purpose or trace metals sampling.

Available in both Vertical (series) or Horizontal (single unit) configurations.

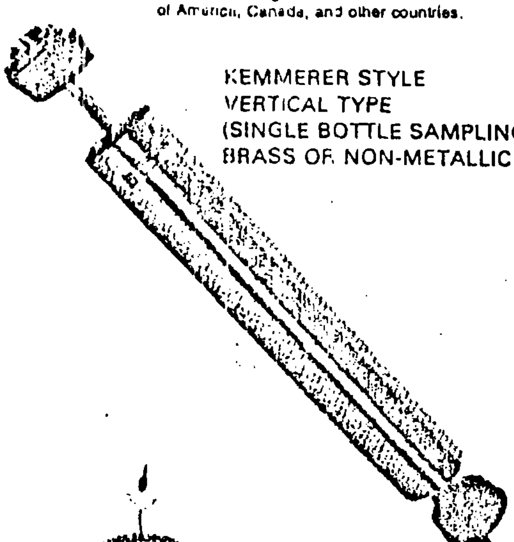
NANSEN TYPE OCEANOGRAPHIC REVERSING SAMPLER — Designed primarily for Oceanographic Sampling, the Nansen type bottle has been considered a standard by some users for many years.

Our Teflon Lined version is made to U.S. Coast Guard specifications (No. CG 120091) and an optional Coast Guard Style Repair Kit is available.

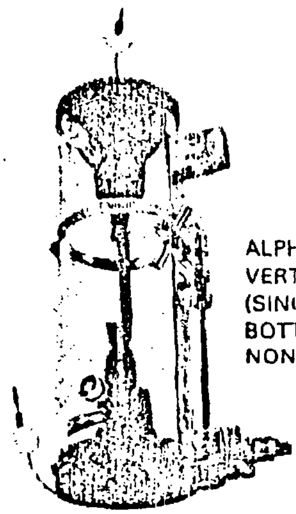
When activated by messenger action, Tapered Valves at each end close, Bottle reverses position 180° and second messenger is released for next series sampler.

Kemmerer Trip Head

Patents Pending in the United States of America, Canada, and other countries.

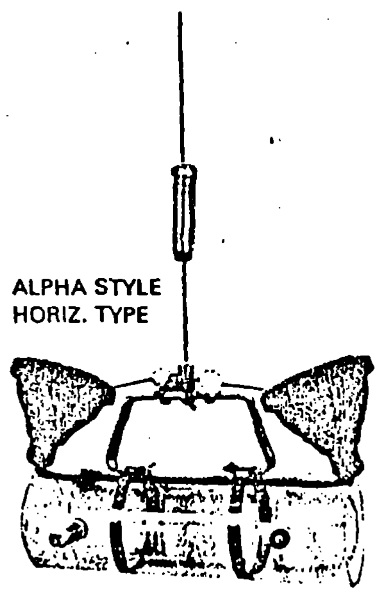


KEMMERER STYLE
VERTICAL TYPE
(SINGLE BOTTLE SAMPLING)
BRASS OR NON-METALLIC

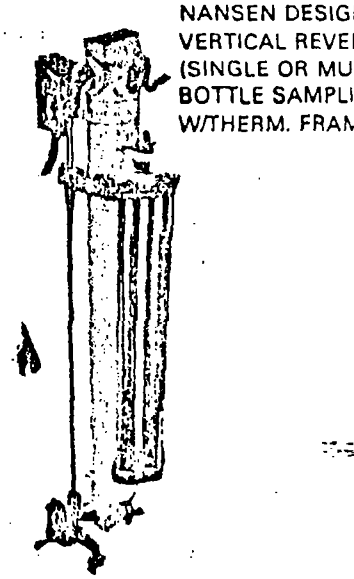


ALPHA STYLE
VERTICAL TYPE
(SINGLE OR MULTI-BOTTLE SAMPLING)
NON-METALLIC

ALPHA STYLE
HORIZ. TYPE

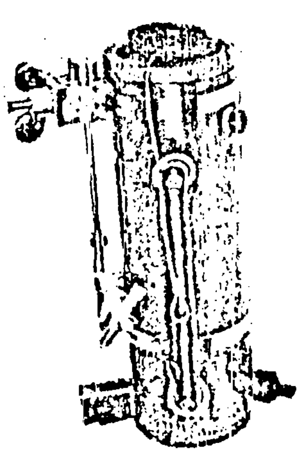


Patents Pending in the United States of America, Canada, and other countries.



NANSEN DESIGN
VERTICAL REVERSING TYPE
(SINGLE OR MULTI-BOTTLE SAMPLING)
W/THERM. FRAME

Ekman Trip Head
Used on Ekmans and Horizontal Alpha & Beta Bottles.



BETA STYLE
VERTICAL TYPE
W/RIGID END CAPS
(SINGLE OR MULTI-BOTTLE SAMPLING
NON-METALLIC

Sediment Sampling Protocol

Introduction

Bottom sediments are defined, for purposes of this method, as settleable solid materials, formerly in suspension, which have accumulated on river, stream or pond bottoms. These materials generally settle to the bottom in areas of reduced water velocity and agitation.

Objectives

The major objective of this method is to collect a sample of bottom sediments, representative of settled solids that have been introduced into the seepage pit as storm water run-off. As a step to assure comparability of samples, bottom sediment samples will be restricted to the upper 1/2 inch of recently deposited sediments. Contamination of samples will be avoided by acquisition and handling of samples with clean, uncontaminated equipment, which is discussed later in this protocol.

Equipment

The Ekman Bottom Dredge is used to obtain bottom sediment samples. This all stainless steel sampler has a 216 cubic inch sample chamber (6" x 6" x 6") and is an excellant bottom dredge for obtaining quantitative and qualitative samples. The Ekman's design for low drag and good descent stability, positive acting lid and jaw control system (to reduce sample washout during retrieval), and enclosed trip release mechanism (activated by a stainless steel messenger) secures the integrity of each sample.

Field Method

1. Assure that all sediment sampling equipment is clean and has been rinsed with acetone.
2. Rinse all sediment sampling equipment with water to remove any residual acetone.
3. Locate sampling point with respect to a landmark, or a grid system. Log in field book the sampling location, sample number, and average water depth at each sample location.
4. With jaws of sampler open in sampling position, slowly lower the dredge until it comes in contact with the bottom.
5. Allow the line to become perpendicular to water surface.
6. Release stainless steel weighted messenger to trigger release mechanism.
7. Slowly lift the sample to the surface. Allow most of the water in the sampling chamber to drain.
8. Deposit sample into large clean stainless steel pan.
9. Remove only the top sediment layer (about 1/2 inch) for sample analysis. Avoid retention of any bottom materials which have come into contact with the pan.
10. Repeat steps 4-9 to obtain enough top sediment to fill the sample container supplied by the contract laboratory.
11. Properly label all sample bottles with date, time, sample location and sample designation; and place in chilled cooler.
12. Complete chain-of-custody form and transport samples to contract laboratory.

Cleaning Equipment*

1. Wash all sampling equipment (stainless steel pans, spoons, dredge, etc.) with a detergent and de-ionized water solution, using a bottle scrub brush as needed.
2. Rinse with de-ionized water to remove detergent.
3. Rinse with a small amount of acetone, assuring contact of acetone with the total surface.
4. Rinse with de-ionized water to remove contaminants dissolved by the acetone.

This cleaning process is required when changing sediment sampling locations and prior to sampling at any new site.

*Taken from the Illinois Environmental Protection Agency, Division of Water Pollution Control Field Methods Manual, published in 1984.

CHAIN OF CUSTODY

Company's Name ______________________ Telephone (   ) __________

Address ____
street city state zip

Collector's Name ______________________ Telephone (   ) __________

Date Sampled ______________ Time Sampled ______________ hr.

Field Information ____________________________________

____

____

____

Sample Allocation:

1. ____
name of organization

2. ____
name of organization

3. ____
name of organization

Chain of Possession:

1. ______________ ______________ ______ ______
signature title inclusive dates

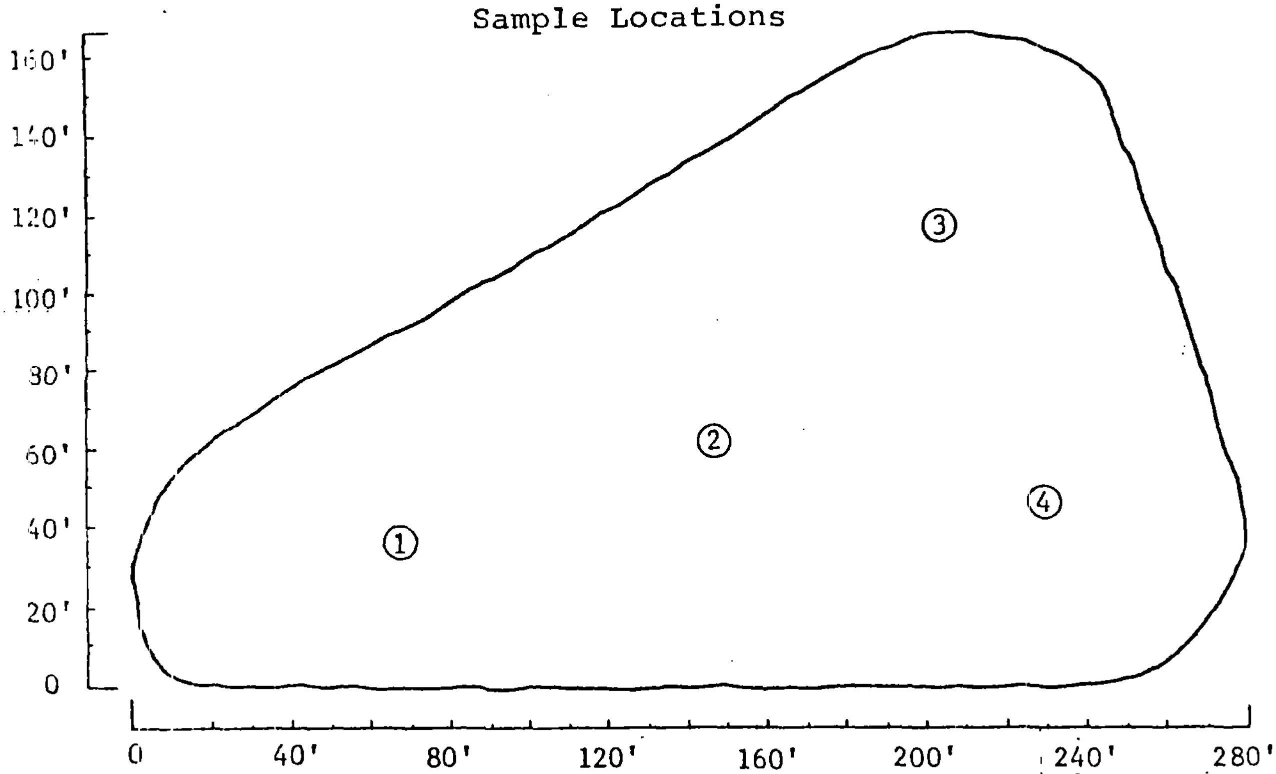
2. ______________ ______________ ______ ______
signature title inclusive dates

3. ______________ ______________ ______ ______
signature title inclusive dates

ROCKFORD PRODUCTS CORP.

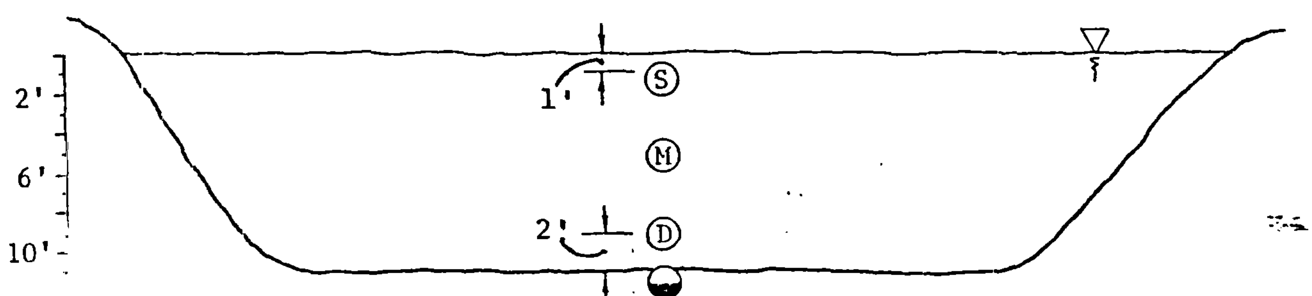
Seepage Pit

Sample Locations



Plan

Typical Stratified Sampling



Profile

(S) — Shallow Water Sample

(M) — Medium Water Sample

(D) — Deep Water Sample

◒ — Sediment Sample

BOTTOM DREDGES — GRAB TYPE

- Wildco-Ekman, (4) Sample Chamber Sizes
- Wildco-Ekman, "Tall" Version
- Ponar Grab
- Wildco-Petersen
- Accessories/Supplies

BOTTOM SAMPLING EQUIPMENT

wildco

Section 3

A **WILDCO-EKMAN, STANDARD DREDGE** (Cat. No. 196) — Most popular size for general applications. Chamber Volume: 216 cubic inches (3,540 cm³). Chamber Dimensions: 6" x 6" x 6" (152 mm x 152 mm x 152 mm) complete with carrying case.

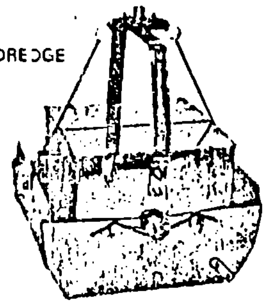
B **WILDCO-EKMAN, STANDARD DREDGE, TALL VERSION** (Cat. No. 196-T) — Same cross-section area as Cat. No. 196 Except that sample chamber has more vertical area. Can be outfitted with extra weights for deeper penetration into bottom sediments. An optional operating handle (5) feet long (1.5 meters) is also available so that this versatile dredge can be hand operated by (1) man from a boat, dock or shore. Chamber Volume: 324 Cubic inches (5,310 cm³) Chamber Dimensions: 6" x 6" x 9" (152 mm x 152 mm x 229 mm) complete with carrying case.

A **WILDCO-EKMAN LARGE DREDGE,** (Cat. No. 197) — Same basic dredge as the standard model, except for a larger sample chamber. Chamber Volume: 729 Cubic inches (11,950 cm³) Chamber Dimensions: 9" x 9" x 9" (229 mm x 229 mm x 229 mm) complete with carrying case.

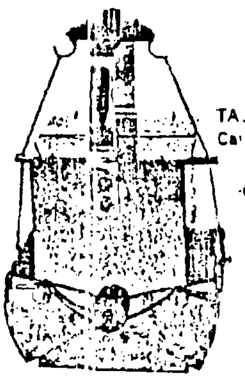
A **WILDCO-EKMAN, EXTRA LARGE DREDGE** (Cat. No. 198) — Same basic dredge as the standard model except that it has (8) times the volume and can obtain good penetration into sediment because of it's weight. Chamber Volume: 1728 cubic inches (28,322 cm³) Chamber Dimensions: 12" x 12" x 12" (305 mm x 305 mm x 305 mm) complete with carrying case.

WILDCO-EKMAN BOTTOM DREDGE
Catalog No. 196, 197, 198

A



B

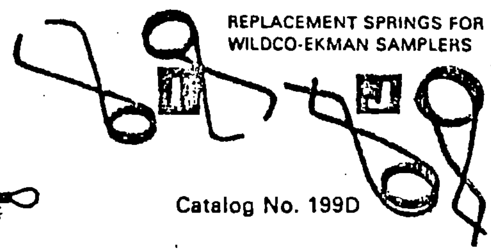


TALL EKMAN BOTTOM SAMPLER
Catalog Order No. 196T

* Patents Pending in the United States of America, Canada, and other countries.

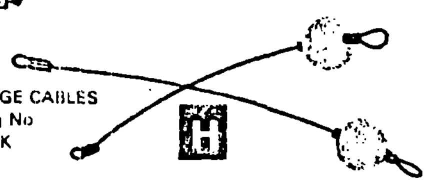
Catalog No. 199C

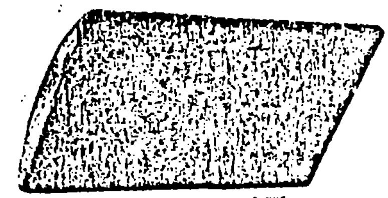
REPLACEMENT SPRINGS FOR WILDCO-EKMAN SAMPLERS



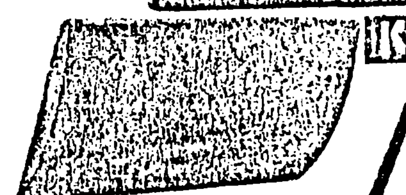
Catalog No. 199D

WILDCO-EKMAN DREDGE CABLES REPLACEMENT Catalog No 196K, 197K, 198K, 196TK

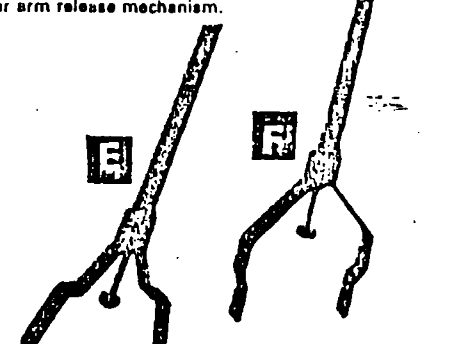




EXTRA WEIGHTS FOR TALL EKMAN BOTTOM SAMPLER
Catalog No. 196TW



HANDLES FOR WILDCO-EKMAN DREDGE
Fit on No. 196. Left is No. 196HC for new enclosed plunger release mechanism; right is No. 196-H for older units with exposed lever arm release mechanism.



WILDCO-EKMAN DESIGN — FOR SOFT/SANDY VEGETATION FREE BOTTOMS

Features

1. Positive acting lid and jaw control system.
2. Flow through design for low drag & good descent stability.
3. Reduced Sample wash out when raised.
4. Solid brass construction-stainless steel springs & cables.
5. Marine plywood carrying case with polyurethane finish.
6. New enclosed trip release mechanism — improved performance.

An excellent bottom dredge for obtaining quantitative and qualitative samplings of macroscopic bottom fauna used in making productivity, biological and geological studies of soft river, stream, and lake bottoms.

Unique design of sample chamber lid and jaw assembly release mechanism* offers not only positive action when activated but also helps to reduce instability and frontal shock wave effects when lowered rapidly.

Dredges are available in four (4) sizes with sample chambers ranging from 216 cubic inches (3,540 cm³) to 1728 cubic inches (28,322 cm³). A "Tall" version is also available with optional weights for deeper penetration into sediment, and a 5 ft. long operating handle for shallow water applications.

Optional Equipment

1. Lid Control Systems for all models.
2. A Crane Hoist such as our Cat. No. 80, or 85, is recommended when using dredges No. 197 or 198. Example: Dredge No. 198 fully loaded might exceed 90 lbs. (41 kg).
3. Brass screen mesh No. 30 (516 Micron Openings) is available for lid openings on all models. No extra charge for installation at time of purchase.
4. Messengers No.'s 45 or 46 are required for activation.
5. Lines No's 61 or 62 are recommended for Dredges No. 196 and 197.
6. Line No. 61 (Aircraft Cable) recommended for dredge No. 198.

* Ekman Trip Head
Used on Ekmans and Horizontal Alpha & Beta Bottles

744 REV. ED.

Groundwater Sampling Protocol

Introduction

This plan describes procedures for collecting representative samples from groundwater monitoring wells. It is created to ensure compliance with RCRA 40 CFR 265.90 groundwater monitoring requirements, but is also acceptable for non-RCRA monitoring.

Sampling Equipment

- Measuring tape with a Keck Drop Lite Indicator, used for acquiring water elevations.
- Galtek Teflon Bailer with a sampling capacity of 1075 cc.
- Teflon or stainless steel bailer cord.
- Hydac Conductivity, Temperature, pH Tester.
- Peristaltic hand pump and Geotech backflush filtration unit with a 0.45 um. membrane filter for field filtering inorganics.
- Teflon forceps.
- Sampling bottles with preservatives, conforming to Standard EPA protocol. Bottles are to be supplied by the contract laboratory. Separate bottles are required for volatile and inorganic analysis.

Field Method

Groundwater sample collection is in three steps: A) measurement and recording of pre-bailed water levels, B) evacuation of water in the well casing and in the envelope surrounding the well screen, and C) actual collection of samples.

A) Well Evacuation

1) Assure all of the groundwater sampling equipment has been cleaned.

2) Identify well and log on field data sheet.

3) Put on disposable gloves and rinse with distilled water.

4) Carefully lower the Drop Lite on measuring tape to measure and record the initial water level in the well relative to the top of the well casing. Care must be taken to assure that only the tip of the unit penetrates the top of the water surface.

5) Calculate the volume of water in the well casing. The monitoring well will require bailing until three (minimum) standing well volumes of water have been removed, or until the well is bailed dry.

6) Using the teflon bailer, begin bailing the well from the bottom, being careful to keep the bailer cord off the ground and away from clothing. Periodically agitate the bailer up and down to resuspend and remove any materials settled in the well. To confirm volume removal, all groundwater should be poured from the bailer into a five gallon bucket to measure the quantity of water removed from the well.

7) Prior to sampling, allow the well to recharge with sufficient groundwater to permit collection of the desired sample volumes.

B) <u>Groundwater Sampling</u>

1) Rinse the teflon bailer and cord several times with distilled water.

2) Remove the sample bottles from their transport container and prepare bottles for receiving sample. Sample bottles are labeled with the sample number, date and time of sampling and sample location. Optional information may include requested analyses and/or type of preservative, if requested by the laboratory. Sample bottles should be kept closed until they are ready to receive the groundwater sample. Always fill the containers for volatile organic analysis first, if applicable.

3) Initiate sampling by lowering the bailer slowly into the well, taking care to submerge it only far enough to fill it completely. This will minimize agitation in the well.

4) If samples are to be collected for volatile organic analysis, fill the sample bottle from the first bailer removed from the well. Fill sample bottle completely to eliminate any head space, and place in cooler.

5) Fill the sample cup of the Hydac Conductivity, Temperature, pH Tester with the remainder of the first bailer sample. Log the temperature, specific conductance and pH on the field data sheet.

Rob Watson

EP-7
FILE

Rockford
Cold Formed Products

Rockford Products Corporation
707 Harrison Avenue
Rockford, Illinois 61108-7197
(815) 397-6000
Easy Link 910997-7453

March 19, 1986

2010300031 - WINNEBAGO
ROCKFORD / ROCKFORD PROD #3

Illinois Environmental Protection Agency
Region 1
4302 North Main Street
Rockford, Illinois 61103

Attention: Mr. Harris Chien
Manager

Dear Mr. Chien:

ROCKFORD PRODUCTS CORPORATION is submitting the following information requested from IEPA meeting held in your office on January 14, 1986 at 2:00 P.M.

After a telephone call to Rob Watson, on January 15, 1986, regarding the surveys for "Certification Regarding Potential Releases From Solid Waste Management Units (Closure Plan Review)"* 8 separate form surveys were completed and sent to Lawerence Esteps office in Springfield, Illinois on January 28, 1986.

* LOG C-191

A revised air permit application was sent to Bharat Mathur on January 17, 1986, for (4) Detrex Degreasers. Permit to operate the (4) Detrex Degreasers was granted on February 24, 1986.

A ground water monitoring plan was prepared for ROCKFORD PRODUCTS CORPORATION submitted herewith by M. Rapps Assoc., Inc. in Springfield, Illinois.

Also a roof storm water plan was developed to minimize contaminents entering the seepage pit submitted herewith by Larry Hammond - Industrial Consultant.

ROCKFORD PRODUCTS CORPORATION has earnestly tried to answer all requirements from the January 14, 1986 meeting, and will continue to work closely with your office until all problems are resolved.

Sincerely yours,

ROCKFORD PRODUCTS CORP.

Harold W. Naill

Harold W. Naill
Vice President of Mfg.

HWN/nc

RECEIVED
MAR 24 1986
IEPA-DLPC

ROOF STORM WATER PLAN - 3-19-86

If as the result of the proposed ground water monitoring plan, it is ultimately determined that storm water run-off from roof of Plant #3 is causing contamination of the seepage pit, than ROCKFORD PRODUCTS CORPORATION will remedy that situation by one of several possible alternatives. Alternatives currently being considered are:

I. a. Make quarterly checks of velocity and exhaust emissions from discharge stacks.

b. Raise exhaust stacks from degreasers 20 feet. Two significant improvements should take place.

1. More condensation of 1,1,1 Trichlorethane will occur in the stack and be recaptured for reuse.

2. The added height of stacks will allow remaining stack emissions to stay in the atmosphere.

c. Modify internal cooling coils to reduce emission stack temperature which in turn will reduce stack emissions up to 40%.

d. To further investigate a proven European technology, using refrigeration chilling coils in the exhaust stacks, where emission reduction rates can be reduced by as much as 90%.

e. Lab analysis of seepage pit water, and samples from test wells will be sent to R. E. Wright Assoc., Inc. for study of volatile organic compounds, and the removal of v.o.c. by using an air stripping tower. If acceptable removal rates can be reached. ROCKFORD PRODUCTS CORPORATION must make a decision to use this process, or one of the following.

II. Work with the Public Works Department - City of Rockford to develop a plan for installation of a storm sewer at approximately the 2800 block on East side of Kishwaukee Street, so that, storm water run-off from roof of ROCKFORD PRODUCTS CORPORATION - Plant #3 could enter, using controlled run-off procedures, and a N.P.D.E.S. Permit.

III. Develop a plan with the Public Works Department - City of Rockford for roof run-off water that will enter into a box culvert running parallel to East property line of ROCKFORD PRODUCTS CORPORATION using controlled run-off procedures and a N.P.D.E.S. Permit.

IV. To investigate with the Public Works Department - City of Rockford, if feasible to use a drainage ditch running from the West side of ROCKFORD PRODUCTS CORPORATION property to Rock River. After topography survey is made, a cost analysis should be made to clean out bottom of ditch for 300 to 500 feet West of ROCKFORD PRODUCTS CORPORATION, so that, roof drainage will properly flow into drainage ditch.

After confirmation of lab reports for present volatile organic compounds, this may prove that a controlled system for run-off waters will be sufficient.

Harold W. Naill

Harold W. Naill
Vice President of
Manufacturing

HWN/nc

RECEIVED
MAR 24 1986
IEPA-DLPC

Rockford Products Corporation

Plant No. 3

Groundwater Monitoring Plan

M. Rapps Associates, Inc.
ENVIRONMENTAL ENGINEERING
2387 WEST MONROE, SUITE 123, SPRINGFIELD, ILLINOIS 62704 — (217) 787-2118

Rockford Products Corporation

Plant No. 3

Groundwater Monitoring Plan

Background

Rockford Products Corporation's (RPC) plant No. 3 is located at 707 Harrison Avenue, Rockford, Illinois. The manufacturing facility, which utilizes various metal finishing processes in the course of its operations, is situated in the heavily industrialized Southeast sector of Rockford. Most of Rockford's industrial activity, principally metal finishing and fabricating, is housed in this part of the city. Adjacent property to the East contains abandoned rail lines, a construction company storage yard, and an auto salvage yard. A conglomeration of heavier manufacturing plants, material suppliers, etc., exists farther to the East, following the Harrison Avenue corridor for several miles. Similar activity exists to the West and Northwest of the plant, including an abandoned landfill, a large foundry, a steel drum reclaimer, and various other industrial operations. Scattered pockets of residential housing exist throughout these areas, in all directions from the plant. The plant site and surrounding areas are shown in Figure 1 in the attachments.

RPC plant No.3 is situated on relatively flat ground that has little natural drainage. As a consequence, storm water from plant buildings and parking areas, joined by drainage from properties to the East, tends to accumulate and pond on plant property. Attempts to divert this water to a municipal storm sewer were unsuccessful and, as such, plant officials have found it necessary to design an on-site remedy. That solution consists of drainage features which gather and divert storm water to a dug pond or seepage pit. The main body of the seepage pit consumes a surface area of approximately one acre. Its maximum depth near the center is approximately eleven feet.

A permit to use the seepage pit was issued by the Illinois Environmental Protection Agency's (IEPA) Division of Water Pollution Control (DWPC) on March 21, 1984. That permit contains a special condition requiring installation of three monitoring wells subject to quarterly water quality testing. Water quality parameters to be monitored include Specific Conductance (S.C.), Chemical Oxygen Demand (COD), Total Organic Carbon (TOC), and Total Organic Halogens (TOX).

Requisite monitoring points were installed in January, 1985. They consist of three two inch I.D. screw coupled PVC wells with slotted screens, each set at a depth of 35.0'. Well screen sections are ten feet in length and intercept the water table. In the second quarter subsequent to well installation, each well and the seepage pit (and attendant storm water ditches) were sampled for an extensive analysis. Results are:

Culvert and Pond Samples (5-8-85)

Sample Locations

Organic Contaminant	S.W. Culvert	S.E. Culvert	Pond	Mean	Variance
1,1,1-Trichloroethane	25 ppb	81 ppb	27 ppb	44.3	672.8
1,1-Dichloroethane	5 ppb	15 ppb	5 ppb	8.3	22.2
1,1-Dichloroethylene	10 ppb	31 ppb	<5(2.5 ppb)	14.5	145.5
1,2-t-Dichloroethylene	7 ppb	16 ppb	<5(2.5 ppb)	8.5	31.5
Trichloroethylene	15 ppb	48 ppb	12 ppb	25	266

Sediment Samples (5-8-85)

Parameter	Sample Location: S.E. Sediment	S.E. Sediment @ 12"
Arsenic	< 0.001 ppm	< 0.001 ppm
Barium	0.54 ppm	0.54 ppm
Cadmium	0.014 ppm	0.005 ppm
Chromium	0.025 ppm	0.024 ppm
Lead	0.03 ppm	0.05 ppm
Mercury	< 0.001 ppm	< 0.001 ppm
Selenium	< 0.005 ppm	< 0.005 ppm
Silver	< 0.001 ppm	< 0.001 ppm

NOTE: The above are analyses of "leachate" based on the EPA EP TOX test. Organic analyses of sediment samples revealed no contamination above detection limits; typically 50 ppb.

Groundwater Samples

	Sample Location				
Organic Contaminant (5-8-85)	W-1	W-2	W-3	Mean	Variance
1,1,1 Trichloroethane	39 ppb	199 ppb	43 ppb	93.6	5550.2
Trichloroethylene	7 ppb	<5(2.5 ppb)	452 ppb	153.8	44,455
Indicator Parameter (1-3-86)					
S.C.	550 umhos	550 umhos	550 umhos	550	-
TOC	49 ppm	8.6 ppm	2.2 ppm	19.9	429.3
TOX	87 ppb	<5(2.5 ppb)	<5(2.5 ppb)	30.6	1586.7

These preliminary analyses indicate the presence of organic contamination in both the pond and in the groundwater; with the solvents 1,1,1-Trichloroethane and Trichloroethylene being common to both. While a greater number of organic contaminants were identified in the pond, the greatest levels of contamination are apparently in the groundwater. Inorganic analyses on sediment samples by the EP-toxicity test method do not reveal metal concentrations out of the ordinary. The same is true of organic analyses of sediment samples, and of indicator parameter analyses of the groundwater.

The water level of the seepage pit is considerably higher than groundwater levels measured in the nearby monitoring wells. This is likely due to siltation in the pit which has apparently acted to reduce the permeability of underlying soils. Those soils, which are principally sand and gravel, would otherwise be quite permeable.

The existing monitoring wells are all set immediately adjacent to the seepage pit, and are no more than 300' from each other. The close proximity of these wells to one another makes it difficult to determine the direction of groundwater flow with certainty. Groundwater in the uppermost aquifer, as is the case with most large unconfined aquifers, flows along a relatively flat hydraulic gradient.

Based on the discovery of organic contamination in the seepage pit and in the groundwater, RPC has agreed to submit a groundwater monitoring plan to IEPA. That plan is required to determine the extent that any contamination from the seepage pit has migrated into the groundwater. The plan is to propose the necessary number of wells, their depths and locations (one upgradient, two downgradient, minimum), provisions for measuring depth to water, a monitoring time table, parameters to be measured, and a schedule for implementation of the plan. The plan is also to endeavor to determine the extent to which contamination from surrounding properties, not owned by RPC and including the adjacent salvage yard, may be entering the RPC seepage pit. The proposal made herein seeks to accomplish these tasks.

Groundwater

Subject site is situated above an outwash filled bedrock valley. The glacial outwash consists principally of sand and gravel, with lesser fractions of silt and clay. It is a major aquifer. Underlying rock consists of the Galena-Platteville Dolomite, followed by the Glenwood and St. Peter Sandstones, all of the Ordovician system. Each of these serve as regional or local aquifers. The outwash and underlying rocks are hydraulically interconnected.

The base of the St. Peter Sandstone is variable throughout the area but is found locally at depths of roughly 400'-500'. It is underlain by rocks of the Cambrian System, including the Templeau Dolomite and thence the Franconia Shale, the latter of which is generally regarded as an aquitard. Confined aquifers beneath the Franconia formation include the Ironton-Galesville Sandstone and Mt. Simon Sandstone, both of the Cambrian System. The base of the Mt. Simon occurs at depths of up to 1600'. These features are illustrated in Figures 2, 3 and 4 in the attachments. They are a location map and two regional cross sections excerpted from the Illinois State Geological Survey report "Groundwater Geology of Winnebago County, Illinois (1960)".

Groundwater movement in the unconfined outwash aquifer occurs through intergranular flow. In contrast, flow in the rocks immediately beneath the outwash occurs in fractures, joints, crevices and solution channels. These rocks are semi-confined aquifers. The lower Cambrian rocks, beneath the Franconia Shale, are confined aquifers.

Bedrock near RPC occurs at an approximate elevation of 500' MSL. This is shown in a bedrock contour map (Figure 5.); taken from the Stanley Consultant's report "A Comprehensive Analyses and Development Plan for the Rockford Water System (1979)". Because ground surface elevations at RPC are in the vicinity of 720' MSL, the local thickness of glacial outwash is at least 220'. As previously indicated, this material is comprised of porous sand and gravel. Locally, its permeability is reported to be roughly 1800 (gpd/ft^2), and is said to range from 1400 - 3000 (gpd/ft^2) in other areas of the city (re: Stanley Consultants report). Transmissivity, as determined from pumping tests, is reported in the range of 300,000 gpd/ft.

Recharge to the groundwater is via local precipitation with an estimated annual net recharge of two inches (re: Stanley Consultants). However, recharge is said to also include induced flow from the Rock River. This is caused by heavy withdrawal from both drift and rock wells, the heaviest pumpage of which occurs in Southeast Rockford. The Illinois State Water Survey reports that total pumpage in this area (RIE & R2E, T43N & T44N) in 1984 was 11.98 MGD and 20.44 MGD from drift wells and rock wells, respectively. Heavy pumpage in the area creates a regional pumping cone sufficient to pull water from the Rock River to the East. Absent this pumpage, groundwater flow in the vicinity of RPC would be Westward, toward the natural discharge area of the River.

Figure 6 identifies public water supply wells located in the vicinity of RPC. It also shows the regional piezometric surface reported in the ISGS publication "Groundwater Resources in Winnebago

County (1948)". It shows a pumping cone centered about city wells 7 and 7A. Pumpage in the area has increased considerably since that mapping. City drift wells No.'s 9A, 11, 19, 28, 35 and 38 were all installed subsequent to 1948. In addition, there are numerous private drift and rock wells in the area shown in Figure 6, as well as dozens of private residential wells. It might be noted that public well No. 14 and several nearby industrial and residential wells were abandoned in the late 1960's as a result of contamination allegedly introduced by the adjacent Peoples Avenue Landfill. No organic analyses were performed on those wells, although shallow wells just North of well No. 14 have been shown to contain contamination similar to that at RPC.

It is presently difficult to predict the direction of groundwater flow at RPC with any precision. Although an Eastward trend is to be expected, the effect of individual wells within the regional area of drawdown, all of which pump intermittently, may be to divert groundwater flow in a number of different directions, depending upon the combination of wells in use at any period in time. The RPC plant in fact operates two production wells set in sand and gravel and which are only approximately 1500' North of the seepage pit. These wells operate intermittently with rated capacities of 300 gpm and 700 gpm, respectively. It is conceivable that groundwater in the vicinity of the seepage pit will be drawn toward the North while RPC pumps are in operation, but then move in another direction when the wells are shut down. This is also possible as regards the operation of other wells in the area. Consequently, it cannot be assumed that the direction of groundwater movement will remain constant during either short term or long term monitoring.

Groundwater flow has both vertical and horizontal components. In the uppermost aquifer, flow in the horizontal and vertical planes subscribes to corresponding hydraulic gradients and permeabilities in those planes, in accordance with Darcy's Law. Glacial outwash is typically anisotropic wherein horizontal permeabilities are greater than vertical permeabilities. However, the degree of anisotrophy is not known in this case. Horizontal hydraulic gradients are relatively flat in the outwash aquifer (i.e., 2.3' per mile). They are determined at the aquifer surface as the differences in elevation of the water table over the distance between the well points used to record those elevations. Vertical gradients are determined in the same manner except that head differences are measured between wells screened at different depths in the aquifer. However, the latter is expensive in that it requires installation of nested deep piezometers. Mathematical modeling is probably a more cost effective way to estimate vertical gradients.

The preceding overview of groundwater flow may overly complicate matters regarding monitoring of the seepage pit. Because the seepage pit resides above the water table, the highest concentration of contamination in the groundwater that might be due to the pit, will occur at the water table. That level of contamination will dilute through dispersion and mixing as it moves downward and outward. Consequently, if the seepage pit is the source of groundwater contamination, the maximum contaminant level in the associated plume will be shown in the existing wells that are set near the water table, adjacent to the seepage pit. It should be noted that because the pit is above the water table any related contamination in the groundwater is likely to appear as a series of small plumes (or slugs) rather than as a continuous elongated sphere. This is all the more true given the likelihood of variable flow directions as might be caused by intermittent pumping in the area.

Variability of flow direction and the discontinuous nature of anticipated plumes suggests that a number of well samplings will be necessary in order to define subsurface contamination on a cause and effect basis. Factored into this effort is the need to distinguish between the impact of the seepage pit and any residual background contamination emanating from other sources. The uppermost aquifer is not only highly susceptible to contamination, but it also overlain by an abundance of potential contamination sources. Figure 7., taken from the Illinois State Water Survey publication "Hazardous Risk via Groundwater due to Past and Present Activities, 1984" shows the location of RPC relative to the location of hazardous waste generators, treaters and disposers in Rockford. Figure 8., from the same report, identifies RPC as being located in an area of secondary to moderate risk from hazardous waste related groundwater problems.

The monitoring plan which follows takes into account the preceding variables and seeks to optimize the effort necessary to define the subsurface plumes within the confines of RPC property. It further seeks to define the "worst case" at the water table. It does not propose to monitor the diluted plume(s) at depth, as given the current uncertainty regarding flow direction, it is not presently possible to predict flow lines at greater depths. Stream lines of vertical flow can, however, be estimated through modeling once water table contours are known. The plan will also seek to define the contaminant potential of the seepage pit using a strict protocol for gridded/stratified pond and sediment sampling. Although not part of this plan, it is also RPC's intention to attempt characterization of upstream storm water which enters plant property from the East. This aspect of the forthcoming investigation does not lend itself to routine sampling and analyses protocol and must therefore be devised by RPC on an ad hoc basis (i.e., Grab sampling of available storm water).

Monitoring Plan

I. Source Identification

In order to properly define its contents, a one-time sampling of the seepage pit will be undertaken, concurrent with the initial sampling of the groundwater monitoring network. The pit will be gridded for stratified water sampling at four locations with samples taken at three depths. A Kemmerer water sampler will be used to perform the stratified pond sampling. A description of sampling methods and a drawing of the pond showing sample locations is included herein under "Pond Protocol". Samples will be analyzed at a commercial laboratory for purgeable organics (volatiles, EPA Method 624.), the indicator parameters CL, SO_4, TDS, TOC and TOX, and the field parameters pH and Specific Conductance.

NOTE: The indicator parameters CL, SO_4 and TDS will be used in this program for pond and groundwater analysis because they generally relate to virtually all contaminant sources and because they are water soluble and therefore are more uniformly distributed in a body of water. In contrast, the organic contaminants in question have only slight water solubility or miscibility and are less likely to display a uniform distribution in a larger matrix of ground or surface water. It should also be noted that the joint use of TDS and Specific Conductance will eventually allow the computation of a correlation coefficient describing the relationship between the two. Therefore, TDS can be quickly estimated with use of a simple field meter.

Settled solid materials (sediment) accumulated on the seepage pit bottom will also be sampled. An Ekman Dredge will be used to obtain these samples using procedures described herein under "Sediment Protocol". Samples will be analyzed for purgeable organics, EPA Method 624. Sample locations will correspond to those of the seepage pit sampling.

II. <u>Groundwater Monitoring</u>

Figure 9. in the attachments identifies the locations of eight additional shallow monitoring wells to augment the three shallow wells now in place. A wide spacing of these wells has been proposed in order to deal with measurement limitations inherent with small hydraulic gradients. Each of the new wells will be screened so as to intercept the water table and will utilize ten foot screen lengths. Well construction will be as was used in setting the inital three wells.

Bore holes will be advanced by continuous flight hollow stem auger to depths that will allow the upper 2-2.5' of slotted screen to reside above the water table. This will accomodate water table fluctuations. Drilling equipment will be cleaned between bore holes to avoid the introduction of cross contamination between wells.

Diagrams identifying typical well details are contained in the "background data" section of this proposal. All wells will be fitted with protectors. In addition, a surveyor will record elevations (MSL datum) for the ground surface, top of pipe and top of protector for each well. Thereafter, groundwater level measurements will be reported to the nearest 0.01', MSL. In this vein, it might be noted that while measurement accuracy to 0.1' is thought to be quite good, measurement to two decimal places is more subject to variation between observers.

Well Materials

Historically, PVC has been the material of choice in monitoring well construction. However, Teflon and Stainless steel casing have found favor in organic contamination investigations due to reported deleterious effects on the casing caused by the organics. In researching this matter it was found that low levels of 1,1,1-Trichloroethane and Trichloroethylene do not promote such effects and that, on balance, any casing related impact should be expected to be well below practical detection limits (i.e., < 5 ppb). Two papers discussing this matter, both obtained from the American Society of Groundwater Scientists and Engineers' Groundwater Manual, are attached. On this basis screw type Schedule 40 PVC casing has been recommended. The casing will be washed prior to installation, as recommended in the paper by Curran and Tomson.

Sampling Schedule

It is proposed that the monitoring network be sampled and analyzed quarterly coincident with monitoring now required by the DWPC seepage pit permit. The length of this monitoring effort will be dictated by laboratory findings, but will in no case be less than one year (i.e., four quarters). Extreme variations in individual wells would be suffcient cause to extend the monitoring period. In this regard, resolution of the problem will require enough data to establish a repeating pattern in individual wells and in all wells taken as a function of one another.

Sampling Protocol

(See Groundwater Protocol Section)

Analytical Procedures

All samples (i.e., groundwater, seepage pit water and sediment) will be analyzed for volatile organics. The seepage pit and groundwater will also be analyzed for a number of indicator parameters. The following chart is a listing of all monitoring parameters, the appropriate preservative, the maximum recommended storage period, the analytical method, and the contract laboratory(s) to be employed for analysis. Analytical methods chosen are either universally accepted in government and industry, or are those recommended by U.S.EPA:

Inorganic Analysis

Parameter	Preservative	Max. Allowable Holding Time	Lab Procedure	Lab
Chloride	0	6	Std. Meth. 407B	1
pH	1	2	Std. Meth. 423	1
Spec. Cond.	1	6	Std. Meth. 205	1
Sulfates	1	6	Std. Meth. 426B	1
TDS	1	4	Std. Meth. 209B	1

Volatile Organic Analysis

Parameter	Preservative	Max. Allowable Holding Time	Lab Procedure	Lab
Purg. Organics	1	5	USEPA 624	1
TOC	2	6	U-V Oxidation Std. Meth. 505B	1
TOX	1	4	(EPA 600/4-81-056) Interim USEPA 450.1 Std. Meth. 506	1

aqualab inc.
3548 35th St.
Rockford IL 61109
815-874-2171

ANALYTICAL REPORT

15 January 1986
Sample No. 37825-27

Mr. Chris Berndt
ROCKFORD PRODUCTS
?07 Harrison Ave.
Rockford, Il. 61109

SAMPLE DESCRIPTION: We[illegible] Samples
P.[illegible] 82634

Date Taken: 12/10/85

Date Received: 12/10/85

Time-Taken	Sample Description	TOX,mg/L
1400	W1	0.087
1430	W2	<0.005
1415	W3	<0.005

T Gartner

Toni Gartner